THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

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March of the Minis

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Whither IBM Networking? Recent introductions raise more questions than they answer/**51**

PBX service seen moving in-house

By John Dix
CW Staff

Because of the increasing cost of maintaining private telecommunications systems, many large users are opting to service their own switches or to have their vendors permanently assign maintenance representatives to their sites.

According to Harry Newton, president of Telecom Library, Inc., a New York-based research firm, users with private branch exchanges that support at least 800 telephones or lines can save money by maintaining a switch with their own full-time service employees.

The cost justification is realized "not only from a maintenance point of view — keeping the thing running and oiled — but also for system changes," Newton said. The break-even point varies by application regarding these two considerations.

For example, the relocation of equipment will not figure heavily in efforts to justify a full-time service employee for an office that rarely moves its telephones, Newton noted. On the other hand, system uptime is a crucial consideration, regardless of station moves, for facilities such as hospitals, which can typically justify having a service employee for systems with fewer than 800 lines..

Putting a dollar value on it, William Cobb, executive vice-president of subsidiary operations at Executone, Inc., a value-added PBX distributor based in Jericho, N.Y., said, "The bigger companies can justify going out and hiring a $50,000 to $60,000 communications specialist to handle maintenance."

This has not always been the case.

It is a strategy made feasible by major

See PBX page 6

AI future threatened

Lack of personnel may stunt commercial growth

By John Gallant
CW Staff

After years of research, artificial intelligence technology is finally poised to enter the mainstream of information processing. But analysts warn that a shortage of qualified personnel may cramp the emerging market for commercial AI applications.

Formerly rooted solely in the academic arena, AI has taken on a new market orientation as the wide-ranging technology is adapted to solving real-world problems. In the areas of expert or knowledge-based systems, natural language machine interfaces and vision and speech recognition systems, it is clear that AI applications have already begun to make commercial inroads.

"Artificial intelligence has been an area of interest in academia for some 25 years now. But there really has not been much of a market for AI techniques in industry until very recently. Things have started to heat up for a couple of important reasons," said Herb Halbrecht, president of the Stamford, Conn.-based personnel search firm Halbrecht Associates, Inc.

"First, the hardware required to undertake specialized AI development work has dropped in price dramatically. In addition, the research done at the major universities and the forerunner AI firms has moved us closer to the reality of implementing AI in the wider commercial market," he maintained.

While something of a vindication to the early pioneers of AI, the hard-won market interest may place a new obstacle in the technology's path to commercial acceptance. The influx of start-up companies and the creation of AI product develop-

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TOP OF THE NEWS

Not your run-of-the-mill breaking and entering. Two people were charged with entering a Sperry Corp. defense plant and smashing military computer equipment. Meanwhile, the Justice Department reported that computer-assisted crime against the government is on the rise. **Page 2.**

■

Picking up the pace. Amdahl Corp. has accelerated by six months its schedule for delivering IBM's Extended Architecture on Amdahl's 580 series dual processors. **Page 4.**

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Divide and conquer. Metropolitan Life Insurance Co. has reassigned 900 of the 1,025 programmers at its central DP site to individual departments. **Page 6.**

■

With its annual users meeting as a stage, McCormack & Dodge Corp. brought out a real-time office communications system as well as a report writer as additions to its Millennium line. **Page 13.**

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Broker's sysop. An electronic bulletin board is part of the microcomputer software distribution effort at Merrill Lynch Pierce Fenner & Smith's information center, and Kenneth Edelstein is the systems operator. **Page 24.**

■

NCR Corp. unveiled a line of desktop office workstations and related peripherals that the company plans to market as an office automation system to large companies. **Page 55.**

■

FYI

Despite loss, investor stands by system

By John Gallant
CW Staff

BOSTON — In hindsight, there are some choices you would not make again — even on the advice of a computer. Dean LeBaron knows that all too well.

LeBaron is president of Batterymarch Financial Management, an investment management firm here that became the largest shareholder in the financially troubled Continental Illinois Corp. on the basis of a computer system's selection of that failing bank's stock.

But despite what may amount to a nearly $30 million paper loss due to Continental's decline, Batterymarch intends to stick with its computer-aided investment analysis strategy — a strategy that, LeBaron said, has handsomely rewarded the firm's 150 clients through the years.

LeBaron said that neither he nor any of Batterymarch's 11 other portfolio managers ever looked at Continental's financial statements in great detail. Instead, the bank was selected as an investment candidate by Batterymarch's computer system (see story page 9) after it searched through data tapes containing financial information on some 8,000 companies.

The computer used in-house software that embodied Batterymarch's broad investment strategy, which involves purchasing what LeBaron labeled undervalued stocks or potential high-yield stocks. According to the computer, the common stock of Continental Illinois neatly fulfilled the requirements of that strategy.

In line with the computer's findings, according to LeBaron, Batterymarch pur-

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GOP Convention

The Republicans had a grand old time in Dallas last week, and various computer systems kept the media, the delegates and the public in the know about the party convention. **Pages 10-12.**

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NEWSPAPER

Two charged for hammering Sperry units

EAGAN, Minn. — Two people have been charged with entering a Sperry Corp. defense plant here and using hammers to smash military computer equipment.

A grand jury was expected to hear evidence last week in the case against John LaForge and Barbara Katt, both of Bemidji, Minn. They are charged with destroying government property.

According to a Sperry spokesman and authorities, the incident took place on the morning of Aug. 10, when the two allegedly entered a manufacturing prototype laboratory at Sperry's Defense Systems Division plant. The two caused damage estimated at between $55,000 and $65,000 before they were spotted by Sperry employees, who then alerted local police. They surrendered to police without a struggle.

In a hearing before a U.S. magistrate, LaForge, acting as the pair's attorney, entered what he called a citizen's indictment, alleging that Sperry violated peace and humanity by its involvement in nuclear weapons equipment manufacturing.

Sperry spokesman Don Bruun said last week that the computers damaged in the incident are used, among other things, for nuclear weapon guidance and control. The equipment involved was a processor chassis used for a U.S. Air Force airborne computer system and two power supplies used for Navy shipborne computers, he said.

Bruun said the company and the Federal Bureau of Investigation have not determined how the pair gained entry to the plant, but have ruled out a forced entry. He said the plant is a "defense secure facility," which is surrounded by a fence and has guard stations.

Sperry "is taking measures to make sure (a similar incident) doesn't happen again," Bruun said.

If convicted, LaForge and Katt each face a maximum penalty of 10 years in prison and a $5,000 fine.

System tracks federal computer crime

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — Although still few in number, computer-aided crimes against the U.S. government are on the increase, the Department of Justice has determined.

Donald Foster, deputy chief of the Justice Department's Fraud Division, said the department has received 3,700 fraud referrals in the first half of 1984, of which 20 are computer related. The approximate dollar value of the computer-aided crimes is more than $1 million, Foster said.

In comparison, the department's Fraud and Corruption Tracking system (Fact) received 3,000 referrals during all of 1983, of which only eight were computer related.

To obtain the figures, the Justice Department implemented the Fact system to pinpoint instances of crime against the government, particularly computer-aided crime.

Last week, the Justice Department received the tracking system's statistics for the first six months of 1984, the second year for which the system has been in operation. Statistics show that because of increased reporting, the number of known computer-aided crimes against the government has jumped from 1983.

To date, the largest incident of computer-aided crime referred to the Justice Department involves the 1984 theft of approximately $500,000 worth of federal government property through the manipulation of a computerized bid-solicitation system run by the government.

Foster said the bid system was manipulated with the end result that government property was delivered to a fictitious government warehouse.

The Fact system is designed to centralize the records of referrals and resulting prosecutions of all fraud and corruption charges that are reported to the Justice Department's Fraud Division. It is not devoted solely to computer-aided crimes.

Foster said that the greatest incidence of fraud committed against the government comes in Defense Department-related contracts. "Nearly half of the fraud cases involve $5,000 or less, but 10% of the frauds involve $1 million or more," Foster said.

Once a fraud case is referred to Washington, D.C., it is keyed into the Justice Department's Fact system, where it will remain until the U.S. Attorney's office initiates a case against the party committing the alleged fraud.

Once final action has been completed by the prosecuting attorney, the resolution is entered into the Docket and Reporting system that connects U.S. attorneys across the country.

A major obstacle toward getting the Fact system up and running efficiently in the two years of its existence has been the merging of the Fact system with the U.S. Attorney's reporting system, Foster said.

The most common types of computer-aided crime against the government involve the creation of phony files where unemployment benefits, social security payments, food stamps and welfare stipends are diverted. Federal, state and county employees who administer these programs are usually involved in the diversion scheme, Foster said.

Teen charged with data larceny

MARLBORO, Mass. — An 18-year-old high school student pleaded not guilty last week to larceny charges for allegedly gaining illegal access to his high school's computer system.

The case against David Durant of Marlboro High School was continued to Sept. 25 in Marlboro District Court. Durant, who was released on his own recognizance by Judge Robert A. Belmonte, was charged with stealing electronically processed or stored data with a value of more than $100. If he is found guilty, he could be sentenced to a maximum of five years in prison.

According to Marlboro Superintendent of Schools David Flynn, in late June and early July, an employee in the school's computer service department noticed that someone had attempted to gain access to files in the school department's Digital Equipment Corp. PDP-11 minicomputer. Flynn said the irregularity of the attempted entries into the system, generally used on a time-sharing basis, led school officials to suspect tampering. "It appeared to us that they were trying to access anything, and that's what made it so cuckoo."

Flynn said the person attempting entry tapped into the computer system via telephone lines. "He ran a stat, saw what jobs were up and tried to get in. But he never got past the passwords," Flynn said.

School officials contacted authorities who, in conjunction with New England Telephone Co., traced the telephone calls to the Durant home. A juvenile was also charged in the case.

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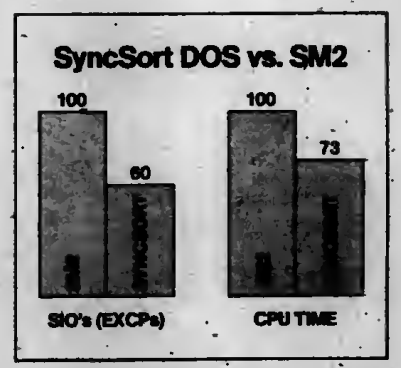

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Amdahl hastens availability of XA on 580 dual processors

By Jeffry Beeler
CW West Coast Bureau

SUNNYVALE, Calif. — Amdahl Corp. last week accelerated by approximately six months its schedule for making IBM's Extended Architecture (XA) available with the two dual-processor members of its 580 mainframe family.

In February, Amdahl announced its intention to add XA to its 5867 and 5870 large-scale CPUs by the second quarter of 1986.

Now, however, the firm has revised its delivery timetable to allow users of the two dual-processor models to begin installing XA by the fourth quarter of this year, two quarters earlier than Amdahl had originally planned.

Amdahl's efforts to adapt the 580 series to run XA began last June with the mainframe family's three uniprocessor models — the 5840, 5860 and 5860, according to Dave Anderson, the company's director of product programs. The enhancement process required the company to redesign significantly part of the uniprocessors' hardware.

"But as it turned out, the design changes we had to make to add XA to the uniprocessors were similar to the modifications that were necessary to install the feature in our dual processors," Anderson said. After Amdahl had finished revising the 5840, 5850 and 5860, the task of expanding its XA support to include the 5867 and 5870 was comparatively simple and quick.

"Whatever differences existed between the uniprocessor and dual-processor systems we were able to accommodate with microcode," Anderson said.

Customer shipments postponed

Another factor that contributed to the accelerated availability of XA on the 5867 and 5870 was Amdahl's recent decision to postpone customer shipments of the multiprocessor members of the 580 line — the 5868 and 5880.

Time that the company might otherwise have invested in pushing its multiprocessor systems out the door was devoted instead to the task of adding XA to its dual-processor models, Anderson said.

Amdahl expects to begin updating the 5868 and 5880 to accommodate XA by the end of the second quarter of next year, Anderson said.

The addition of XA to the 5867 and 5870 will reportedly create an upgrade path for Amdahl uniprocessor users who have already converted to IBM's architectural extensions, but who also need the increased capacity of a dual processor.

Future access to XA

Some of those users will undoubtedly choose to run XA on their 5867s or 5870s straightaway. On the other hand, "there's definitely a set of customers out there who may not need to use the added functionality, at least at first," Anderson said. "But their machines will be immediately updated at no charge anyway so that they'll have ready access to XA if they want to use it later," he maintained.

Amdahl's first public statement that it intended to support XA on its 580 series mainframes came shortly after the performance enhancement's introduction by IBM in November 1981. About a year and a half later, when the feature finally began to be shipped, Amdahl announced its XA delivery dates for the uniprocessor portion of its top-of-the-line CPU family.

Not for another 10 months or so, however, did the company disclose a similar availability schedule for XA on the 580 family's two dual-processor members, whose nearest IBM counterparts include the 3084KX and 3084QX.

How Dave Vipler Made The Micro To Mainframe Connection

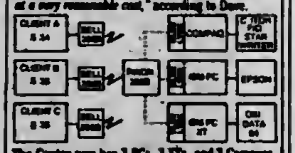
Experienced and committed consultants know that customer support is the name of the game. Dave Vipler, now managing director of the New York based Counter Consulting Center, in his 14 years with I.B.M. saw too many clients get burned by here today-gone tomorrow consultants. What emerged like a lighted program package invariably needed additional work once the consultant left.

Dave recognized that a quality consulting service must provide continuing client support. In 1981 he founded the Center to assist business with their I.B.M. 5/34, 5/36, 5/38, 38xx, 4300 series systems and PCs.

"The Center was organized to provide quality computer consulting to clients that are integrating distributed processing systems into their computer networks," said Dave.

With a staff of 22 professionals, Dave felt that the Center could adequately support its New York City users. Plans to significantly expand their New Jersey operations prompted Dave to find a more convenient method of maintenance, particularly for those programming bugs that only surface after office hours. It was one thing to have a programmer drive an hour each way to spend a full day on site, Dave reasoned, but to make the trip for a half hour of "Firefighting" was too costly.

"One client said, 'How do we get you back if we have problems?' BLUE LYNX was the answer for us at a very reasonable cost," according to Dave.



The Center now has 2 PCs, 2 XTs, and 2 Compaqs, each equipped with BLUE LYNX. Their programmers can now sit at their desks and modify programs on I.B.M. host systems downtown, in New Jersey or wherever the accounts are located. Dave's clients were so impressed with BLUE LYNX that some have bought the hardware/software package for their own internal needs.

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AT&T initiates packet net

FCC investigation of low-cost service pending

WASHINGTON, D.C. — Accunet Packet Service, AT&T's repeatedly deferred, reduced-rate data communications service, finally began operation last week. Initiation of service came despite continuing objections from competitors, who claim that AT&T's rates are low because they are illegally cross-subsidized.

Monthly charges for Accunet Packet Service range from $470 to $1,065 for a host computer port. GTE Telenet Communications Corp., a major competitor, charges $600 to $2,000 for Telenet. AT&T's packet service provides access at 4.8K, 9.6K, or 56K bit/sec via dedicated lines; Telenet offers service at up to 4.8K bit/sec via dedicated or dial-up channels. The $2,000 price applies to 14.4K bit/sec dedicated access. Telenet recently began offering 56K bit/sec access at "about $4,000," according to a company spokesman.

There is a similar difference in kilopacket charges. The rate for an Accunet Packet Service customer who transmits up to 4,000 kilopackets per month is 82 cents per kilopacket. Telenet charges $1.70 for each of the first 2,000 kilopackets and $1.53 for each of the remainder.

John Roeder, Accunet Packet Service staff manager, added that the service's switches are now up and operating in New York, Chicago and Atlanta; additional switches in Denver, Dallas and Los Angeles will go into regular service within the next few weeks. A Minneapolis node is set to come on-line in December.

Roeder said an X.75 interface will become available early next year, and low-speed, dial-up access is slated for 1986. He also said the X.75 interface will make it technically possible for the Accunet service to interconnect with the local packet-switched net planned by most of the divested Bell operating companies.

Accunet Packet Service replaces Basic Packet Switching Service (BPSS), an offering that provided packet switching but not transmission. AT&T's competitors complain, among other things, that rates for the Accunet service are substantially less than those for BPSS, even though the latter service is a superset of the former.

The Federal Communications Commission received the initial Accunet Packet Service tariff last March, but was unable to review it until recently because of other work, a commission spokesman said. The commission will address competitors' complaints in a forthcoming investigation.

Private-line backlog dropping

WASHINGTON, D.C. — For the first time since divestiture, AT&T's backlog of uncompleted private-line orders has dropped, AT&T Vice-President Gus Blanchard told the Federal Communications Commission last week.

The backlog is now about 41,000 orders, compared with 44,000 at the end of July, he said. But Blanchard added that delays in filling orders for private-line services will not be reduced to an acceptable level until, at soonest, the first quarter of 1985.

Some regions are better off than others, Blanchard reported, explaining that today, 60% of the orders for circuits originating and terminating within the firm's Southern region are completed on time — within 48 days after they are received from the customer. By comparison, AT&T overall is currently completing only about 29% of its private-line orders on schedule.

After Sept. 1, "AT&T will meet its due dates nearly all the time for private lines that fall within the states of Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina and Tennessee," Blanchard said.

After Nov. 1, a high percentage of private-line orders originating and terminating within the Eastern region will be completed on time, he added. The Eastern region encompasses Delaware, Maryland, New Jersey, Pennsylvania, Virginia, West Virginia and Washington, D.C.

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Insurer disperses programmers to user departments

By Edward Warner
CW Staff

NEW YORK — The adage "divided we fall" is being disproved by the data processing department of Metropolitan Life Insurance Co., where 900 programmers — nearly the entire central programming staff — were recently reassigned to individual departments and now work only on the assignments those departments generate.

Only 125 of the company's 1,025 DP department programmers remain under the authority of that department as a result of the restructuring, the final phase of which was implemented about two months ago. None of the programmers left their desks in the Electronic Installations department, but four upper level DP managers moved to new offices, one for each of the four business divisions among which the programmers were divided.

The programmers will report directly to those managers, who in turn will report to the business division's manager, explained Dan Cavanaugh, Metropolitan Life's vice-president of Electronic Installations. In addition, he said, the managers will now have a range of authority that includes "some responsibility for the business side."

The restructuring was undertaken, he explained, because "it made sense to move the programmer closer to the line of business." With programmers providing applications development and support directly to the departments, he said, the insurance firm can move more quickly to develop new systems to support its products. "We're clearly dealing with a very competitive field [where] new products are being developed overnight," he said.

In January 1983, two of the four business divisions affected, Pensions, and Property and Liability, provided a pilot test of the restructuring, involving 200 programmers. The concept worked, Cavanaugh said, and about nine weeks ago, the remaining 700 programmers were divided between two other divisions, Personal Lines and Group Operation.

Cavanaugh said the move was not a major restructuring, since the programmers will be working on duties in which they were already involved because of their specializations. The restructuring did change the hierarchy of the Electronic Installations department, though, since most programmers no longer report to Cavanaugh. "In one sense," he explained, "it makes it a little more complex. You have to be sure the standards are in place . . . in comparison to a direct reporting relationship."

To help set standards for communications and systems, Cavanaugh sits on the firm's executive steering committee, which provides standards directions. Those directions are then implemented by the company's standards policy committee, on which the four divisional DP managers sit.

Cavanaugh said that the reshuffling would not have been possible prior to the advent of standards in systems design and languages and the arrival of simplified software. "You should move the programmers closer to the user, because the kind of facilities that are being provided now are closer to user facilities," he observed.

Analyst links PBX woes to faulty setups

Installing your private telecommunications system properly the first time can drastically reduce future maintenance problems, according to one industry analyst.

Harry Newton, president of Telecom Library, Inc. in New York, said that his research company has found that 83% of service calls on private branch exchanges (PBX) are directly related to poor installation.

The success of the original installation is directly related to the amount of interest the user takes in the project, Newton contended. To have fewer system problems, he advised that users work with the vendor to make sure that the PBX is installed within its limitations and its capabilities.

"You wouldn't let a painting contractor come into your house and paint any colors he felt like [painting] on the wall," he explained. "But the reality is that with telephone systems we do that."

The reason users do this, Newton said, is because this purchase decision was once a default decision, and AT&T was the beneficiary.

Times have changed. AT&T is no longer the only game in town, but Newton said that the other vendors do not have its 50 years of experience. "Taking an active interest in the installation of a switch today will aid in maintaining that switch later," he said. Through that participation, users can learn enough to solve most common problems, Newton claimed.

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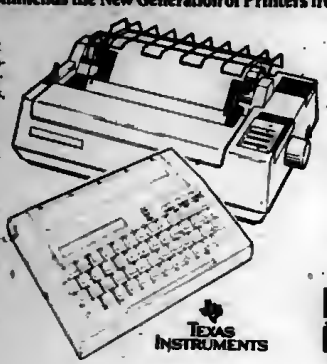

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TEXAS INSTRUMENTS

DJC

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changes in the way the telecommunications industry prices maintenance, according to Edward White, president of New York-based Centel Financial Systems, a joint venture of Centel Business Systems, Inc., and British Telecom.

White said that for a long time maintenance was provided by the so-called interconnect vendors — PBX manufacturers other than AT&T — at prices below the cost of providing the service. "This was due to the camouflaging of maintenance [costs] by the Bell system, which would incorporate [them] into a rental rate structure," he explained. "To compete, the interconnect industry had to maintain a low, long-term cost structure to keep from scaring customers off."

While increasing orders helped defray the cost of providing service below cost, the doldrums that the PBX industry hit in 1982 narrowed vendors' margins and, according to White, forced the maintenance issue to the surface.

The timing was right. The need for greater profitability roughly coincided with the implementation of a Federal Communications Commission regulation that detariffed new customer premises equipment. White contended that this put AT&T on an equal footing with the interconnect vendors, forcing it to provide maintenance at cost and preventing it from hiding that cost within a tariffed rental contract.

Beginning last year, the industry as a whole moved into a cycle that will see maintenance prices come up to cost and then become profit centers for PBX vendors, according to White. He calculated that PBX manufacturers have traditionally broken even or lost 15% to 20% on maintenance. Now they are out to make a 5% to 20% profit on the service. As an example of this, Newton said, PBX manufacturer Rolm Corp. nearly doubled its maintenance prices in the last year.

Cobb agreed that maintenance prices should be increasing, but said a limiting factor is competition with industry newcomers who are giving service away to establish a toehold in the business.

White and Cobb agreed, however, that it will not be long before maintenance charges in the telecommunications industry reflect practices within the data processing realm. White said the computer industry's maintenance prices are typically 10% of the system's purchase price per year, whereas communications upkeep costs have hovered around 5%.

This migration will further encourage users to explore the idea of performing their own maintenance, or at least to shop around for the best maintenance contract.

Major differences in contracts are just beginning to surface. While some vendors continue to provide a standard agreement, others are establishing multitiered service structures, driven by the idea of making the customer that costs you the most pay you the most.

White said such a plan may offer 24-hour service, seven days a week, for $5 a port; 24-hour service, five days a week, for $4 a port; or business-day service, five days a week, for $3 a port. While the prices may be different, AT&T announced a similarly structured maintenance plan in June [CW, June 18].

This will enable the user, faced with rising maintenance prices, to stabilize his costs by opting for lower levels of services. White said many users are evaluating the idea of going with the business-day service, knowing they can get special overtime service at a per-visit cost when and if they need it.

From [redacted], to

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NEWS

Food stamps give way to POS terminals in project

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Department of Agriculture (USDA) will soon place point-of-sale computer terminals at food stores in Reading, Pa., under a pilot program aimed at replacing the paper coupons used in the USDA food stamp program with an electronic funds transfer system.

Under the Electronic Benefit Transfer Alternative Issuance Demonstration Project, grocery stores will be outfitted with terminals at checkout lines, where customers will present a special identification card and tap in a four-digit code to make a food stamp transaction, USDA officials said last week.

The automated system will be more secure than the paper coupons, according to Jane Vachon, spokeswoman for the USDA Food and Nutrition Service, because it prevents illegal trafficking in coupons for cash, counterfeiting, forgery and loss or theft of coupons sent in the mail. In addition, the photo ID card and four-digit code prevent unauthorized people from receiving the program's benefits, she added.

Start-up in Reading is planned for Oct. 1, Vachon said. The $2.9 million demonstration project, designed and implemented by Planning Research Corp. (PRC) of McLean, Va., will continue for 18 months and will be evaluated by ABT Associates of Cambridge, Mass., according to the Agriculture Department.

PRC is operating the Electronic Benefit Transfer project computer center in Reading with two IBM Series/1 Models 4954 and 4956 minicomputers, which communicate with Omron Electronics, Inc. CAT-100 terminals and NCR Corp. Model 3213 printers, a PRC official said.

The USDA notice in the Aug. 21 "Federal Register" described several features of the Electronic Benefit Transfer project:

- The dollar value of the recipient's benefits will be electronically placed in the recipient's account, and unused benefits remain in the account; there will be no cash change from transactions.
- The benefit card will be a standard Pennsylvania photo ID card with an account number and a magnetic stripe. Purchasers must enter the four-digit personal ID number on a small key pad to make a transaction. The printer produces a receipt for the purchaser.
- If the terminals or computer system malfunction, a paper backup system will be used to permit purchases up to $35. Terminals will be repaired within three hours. The USDA said computer system failures are unlikely because there are two redundant systems.
- Retailers cannot discriminate against food stamp shoppers. "While there may be some limitation to the number of checkout lanes which have equipment for transacting benefits, excessive waiting time for recipients beyond that for other shoppers will be unacceptable," according to the USDA.

Turn to in-house training for AI

If the threatened shortage of experienced artificial intelligence personnel materializes, analysts said, corporations beginning to focus on AI applications may turn to in-house training programs to fulfill their needs for qualified personnel.

"In order for AI to make the advances predicted for it, we have to build the base of training and experience. The universities are trying to do that, but companies are stealing professors away. More and more companies will have to rely on in-house training to fill the gap," said Larry Geisel, president of the Pittsburgh-based AI software house Carnegie Group, Inc.

One AI company that has emphasized internal training for nearly three years is Teknowledge, Inc., a Palo Alto, Calif.-based manufacturer of AI systems development tools. According to Rosann Stach, manager of product development, in-house education has proved to be a supplement to the limited resource of university-trained AI professionals.

"The university work force is a limited and very defined set of people. Another solution is to draw on experienced workers from other industries, but that is not a much larger community. We think the most important answer is to grow our own expertise internally," she said.

"If AI realizes its anticipated market growth, we will have to be able to support the products we are developing with specialized personnel. The way to do that is to start with people who do not have Ph.D.'s in AI or computer science and train them internally to be knowledge engineers," she added.

"We are now well into our education program, and we have developed a base of trained people who are moving up through the variety of structured programs we offer."

AI from page 1

ment centers within existing high-tech firms has begun to fuel what some insiders predict will be a staggering demand for experienced AI personnel — a demand they warn is unlikely to be satiated in the near future.

"AI is already being driven into the mainstream information processing marketplace because of the high paybacks it promises," said Larry Geisel, president of the Carnegie Group, Inc., a recent entrant into the AI software market. "But the critical limitation is in the number of skilled people who can implement these new techniques for traditional MIS."

His views were reinforced by Halbrecht, whose personnel agency began to place AI specialists in increasingly lucrative jobs a little over a year ago. "In the entire field, there are probably only two or three hundred people who have any reasonably decent experience in AI research. But the demand for them is going crazy as the big companies get into the field. These firms are getting into a parasitic situation where they are feeding off each other for the experts that are available. You cannot grow your own specialists quickly enough to satisfy your needs."

Halbrecht Associates has recently advertised for positions running the gamut from senior AI research scientist to AI documentation writer, with salaries — touted as completely open — ranging on average between $60,000 and $100,000.

"Today, the very bright people with only a couple years' experience on top of their doctorates can easily get $70,000 to $85,000 in addition to bonuses and often an equity stake in these start-up companies," Halbrecht said.

Those attractive opportunities, however, threaten to weaken the base of personnel further, as the few highly credited AI instructors are lured away from the academic world by companies hoping to cash in big on AI applications. In Halbrecht's words, the AI industry is eating its own seed. What is worse, there seems to be little the universities can do about that frustrating problem.

"I cannot imagine how the personnel shortage won't inhibit the growth of the AI market. But the universities cannot hope to compete with industry in terms of dollars," Jonathan Lynch said.

Lynch is associate director of the University of Miami's Intelligent Computer Systems (ICS) Research Institute and publisher of the institute's newsletter, "The ICS Applied Artificial Intelligence Reporter." The sole hope for universities, Lynch said, lies in the commitment of money to research projects and teaching staffs by industry and the government. He said the U.S. Department of Defense and the Defense Advanced Research Projects Administration have already shown a willingness to shoulder that commitment.

According to Rosann Stach, manager of product development for Palo Alto, Calif.-based Teknowledge, Inc., a manufacturer of AI systems development tools, AI technology itself may provide a solution to the impending personnel crisis. But, she added, the companies currently working in the AI field have already developed specialized tools that will allow reasonably experienced programmers without extensive training in these techniques to address a large percentage of the potential applications.

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Firm's portfolio tactics hang on computer analysis

BOSTON — Batterymarch Financial Management's decision to rely primarily on computer analysis in making its stock market investments was prompted by a desire to improve the output of the formerly manual analytical process.

"Computers forced us to be specific about what we were doing and to impose a disciplined control over whether our portfolios were reflecting the strategies we formulated. The process involves a day-to-day analysis that flows according to what the market is doing, how prices have changed and how our strategy notions evolve. The idea that the use of computers leads you to rigidity in your investments is totally wrong," said Dean LeBaron, Batterymarch president.

The core of Batterymarch's stock analysis system consists of two Prime Computer, Inc. Prime 750 processors at the company's headquarters here. About half of the nearly 100 dumb terminals linked to those superminicomputers are remote units used by employees who work and monitor the computers' activities at home. The computer system is driven by stock selection and investment modeling software developed by Batterymarch's portfolio managers.

LeBaron said the software was designed to reflect the firm's investment strategy. Each night, the system automatically reviews the firm's stock portfolio to determine how individual investments performed within the requirements of that strategy. He said the computer analysis recommends what purchase and sale actions should be undertaken by Batterymarch's portfolio managers. Some stocks may be dropped from the portfolio, while others, which the computer has chosen as possible investment opportunities from data tapes, may be acquired.

"That happens each day," LeBaron said. "The computer never tells us to stay with exactly the same portfolio. We have about a 30% stock turnover each year."

In that role, LeBaron said, the computer is an integral part of Batterymarch's investment process. But the system is also used as a testing tool. Periodically, Batterymarch portfolio managers formulate "what-if" stock purchase strategies that can be tested against the system's investment modeling software to determine how those policies would fare in daily operation. Both the testing and the standard daily functions are supported by a variety of micros.

STRATEGY from page 1

chased about two million Continental shares — approximately a 5% stake in the bank — at a price near $20 per share. After Batterymarch invested in Continental, however, the bank's stock price plummeted. With the value of Continental shares hovering at less than $5, Batterymarch's loss is currently between $24.5 million and $28.5 million.

According to LeBaron, Batterymarch's client portfolios include between 300 and 400 companies at any one time. Over the years, he said, the computer-selected portfolios have performed approximately 5% better on average than Standard & Poor's 500 index. For the second quarter of this year, however, Batterymarch's portfolios lost 8.7%, compared with a loss of 2.6% by the Standard & Poor group. With assets totaling $11 billion; LeBaron said, his firm's problems with Continental's stock were a barely measurable factor in that decline.

"If you are going to invest with a bargain strategy," LeBaron said, "you will always have some individual items that you will later wish you had not chosen. The aggregate result will be composed of some pieces that one would wish, in the light of hindsight, one had not invested in. But you cannot view Continental as a [strategic] mistake or an exception. On the contrary, it was an integral part of the strategy. You just have to try your best not to get distracted by something like that."

LeBaron said that none of Batterymarch's investors abandoned the company or complained of the decision to invest in Continental. He also said the firm has no intention of changing its investment strategies or reducing its reliance on computer analysis.

"We have been following this strategy for 15 years. Our clients understand what we are doing," he said. "The computer's selection of Continental was [made] on the basis of our standard strategy. It was a standard decision."

According to LeBaron, Batterymarch was one of the first investment houses to apply computers and modeling techniques to the selection of securities, portfolio construction and stock trading. But other firms are beginning to follow Batterymarch's lead, he said.

"The reliance on computers is totally separate from our strategy of being a contrary investor. The use of computers seems to be more a function of age. The people who graduated from business schools in the last 10 years are more comfortable with computers than are people who went through that same educational experience two or three decades ago. It is a generational thing," LeBaron said.

At last, the COBOL programmer's guide to VSAM file handling

If you're a COBOL programmer who has anything to do with VSAM...whether you're working on an existing VSAM system, converting to a VSAM system, or just thinking about conversion, you should get a copy of *VSAM for the COBOL Programmer*.

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- why you shouldn't use entry-sequenced VSAM files
- why error processing is a must for VSAM
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Convention demands force electronic mail growth

CW AT GOP CONVENTION

By James Connolly
CW Staff

DALLAS — With almost 500 calls to handle in the first two hours of the Republican National Convention, the operators of an electronic message system discovered that demand was exceeding their expectations.

Spokesmen for Compucorp, Inc. reported that they underestimated the demand on the system they were operating in conjunction with AT&T Communications. They added two front-end terminals to the four that were originally in service.

Compucorp, a Santa Monica, Calif.-based terminal manufacturer, served as a designated electronic mail provider for the convention. It had more than 50 receiving terminals spread throughout the Dallas Convention Center, with most of them serving state delegations.

Minutes after the first convention session ended last Monday, Compucorp spokesman Lance Rentzel assembled 50 terminal operators to inform them that problems associated with the message volume would be remedied.

Compucorp corporate project manager Mike Estrada added, "We're a little bit surprised at the volume."

The message system reportedly had been underutilized during a test run at the Virginia State Republican Convention in June.

Calls for convention attendees were routed to the message center on 10 lines via a System 85 from AT&T Information Systems. AT&T Communications personnel answered those calls on AT&T Merlin terminals, jotted the messages onto printed message forms and handed the forms forward to Compucorp personnel sitting at Compucorp Omegamite terminals.

Those operators typed the messages into the terminals, which forwarded the messages across the hall to six Compucorp 795 terminals acting as file processors.

From the file processors, which kept a backup copy of the message on disks, messages were sent to diskless Omegamite terminals at the front of each delegation. Volunteer operators, who were chosen for their computer knowledge and Republican loyalty, according to Rentzel, viewed the messages on monitors and sent them to Axiom, Inc. electrostatic printers.

At that point, the receiving terminal operators placed the printed messages in envelopes for hand delivery to the delegates for whom they were intended.

CW photo by Jim Connolly
GOP '84, Dallas

AT&T finds new market

CW AT GOP CONVENTION

By James Connolly
CW Staff

DALLAS — Convention management — one-call services for installation and repair service on special telephones — may provide AT&T Information Systems with a new market.

So said the man who arranged for more than 5,000 telephone and data lines at the Republican National Convention here last week. Carl A. Dietz Jr., AT&T Information Systems convention manager, said the business

See DIETZ page 11

Vendor learns its lessons the hard way at political conventions

CW AT GOP CONVENTION

By James Connolly
CW Staff

DALLAS — That politicians preparing for a national political convention cannot take the time to learn to use a computer was one of the lessons learned this summer by a company that provided the Democratic and Republican conventions with microcomputer networks.

"The problem in San Francisco [site of the Democratic National Convention in July] was our inability to train the delegates. We would have liked to work with them on Saturday or Sunday before the convention, but they were just too busy," said Alan G. Saffron, president of American Network Services, Inc. (ANS) of Burlingame, Calif.

Thus, when ANS brought their NCR Corp. System 4-based network here for the GOP convention last week, ANS placed volunteers at the terminals and expected to send 1,500 electronic messages and files through a network covering 46 hotels and the convention center.

Among the first tests of the network at the GOP convention were an Ohio official's request to send a message to every delegation's headquarters hotel and a Hawaii official's request to send a note to the hotel mailboxes of the state's 28 delegates and alternates.

The ANS systems were situated at information booths in the convention center and hotel lobbies, rather than in delegation headquarters' suites as occurred in San Francisco.

The systems included the NCR System 4 microcomputer running Lifetree Software, Inc.'s Volkswriter word processing software; a Centronics Data Computer Corp. H-80 Quietwriter printer; a Gandalf Data, Inc. 409 modem; and a Case Rixon Communications, Inc. 815 statistical multiplexer.

At the heart of the network was a Case Rixon DCX 850 data switch, which, along with modems and multiplexers, was housed in a trailer at the rear of the convention center.

The inability to train delegates and give them personal access to the network meant a cutback in what ANS had hoped to provide for services, Saffron said.

He noted that before the conventions, the company hoped to allow the delegates to run word processing and data processing on their own. That service was to be a test of the ANS product, a planned service in which the firm expected to place personal computers in hotel rooms nationwide.

DIETZ from page 10

opportunity was an unexpected benefit of the AT&T divestiture.

Dietz reported that when the convention operation is cleaned up, he will recommend that AT&T consider more convention management arrangements with other major communications and media-intensive events.

Dietz said that in past years AT&T could not supply unusual non-AT&T equipment or shift equipment around the U.S. He said those restrictions were removed through divestiture and freed AT&T Information Systems to supply non-AT&T equipment.

What AT&T Information Systems provided at the convention center was cabling and terminals for the 30,000 delegates, convention officials and press people.

That task, the planning for which began in January, involved laying more than 70 miles of cable and several thousand miles of copper wire.

The company also installed an AT&T System 85 communications processor, to switch calls among 700 telephones used by the convention officials, and an AT&T Communications mes-

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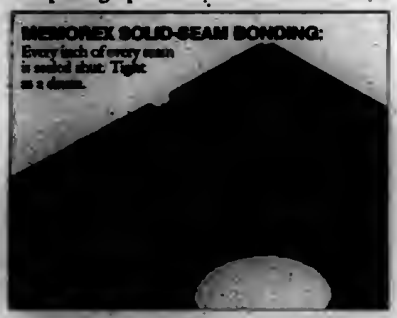

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Electronics vendors canvass the media at GOP meet

CW AT GOP CONVENTION

By James Connolly
CW Staff

DALLAS — With 13,000 reporters, editors, photographers and technicians on hand to cover the happenings at the Republican National Convention here last week, it may have been only natural that a variety of vendors would tag along to help those media personnel communicate with their home offices.

While some major players, such as the Associated Press and the television networks, brought their own transmission equipment to Dallas, smaller news organizations were targeted by electronic transmission vendors whose facilities occupied almost a quarter of the exhibition hall set aside as a massive press room.

The vendors selling their services set up terminals in booths decorated with signs encouraging reporters to transmit articles and to access data bases through their services.

ITT offered domestic and international telex service, Dialcom Electronic Mail Service, Qume Corp. communicating terminals for access to public networks and Faxpak facsimile service.

Apparently aware of how reporters on expense accounts can spend money, Western Union Telegraph Co. pushed its Money Transfer Service — billed as "the fastest way to send money" — along with its more traditional telegram, mailgram and document transfer services.

MCI International, a division of MCI Communications Corp., also offered 24-hour telex service for foreign journalists representing newspapers from as far away as Japan and the Soviet Union.

Federal Express Corp. featured its recently introduced Zap Mail system for two-hour document facsimile transmission, while the U.S. Postal Service had several booths set up for its Express Mail.

On the receiving end, Mead Data Central, Inc., a division of Mead Corp., let reporters use its Nexis online data base for research at several locations throughout the complex.

Among the companies offering services to specific clients was Kee, Inc. of Baltsville, Md., which provided the Voice of America network with approximately 20 word processors.

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Vendor support eases GOP costs

CW AT GOP CONVENTION

DALLAS—The 1984 Los Angeles Summer Olympics boasted an official airline, official candy bar and official snack food, designations that companies earned by contributing to the cost of putting on the summer sports show.

Similarly, the organizers of the Republican National Convention defrayed some of the Dallas political gathering's costs — estimated at between $8 million and $11 million — by naming various companies, including several computer vendors, as official providers for the GOP convention.

AT&T Information Systems installed 5,000 telephones and data boxes in the Dallas Convention Center and convention hotels and a System 85 communications processor.

AT&T Communications operated a message center in conjunction with Compucorp, Inc., which had more than 100 of its Omegamite terminals installed throughout the convention center and convention hotels. Half of the Compucorp terminals were used for electronic mail, while the others were used by Republican officials for word processing tasks, such as handling housing and credentials requests for 30,000 visitors assigned to more than 50 area hotels. The word processing systems also generated several hundred different convention press releases, various convention information sheets and guidebooks.

The vendors and the convention organizers were reluctant to reveal what the convention paid for the vendor services and the value of those services and equipment. But one Republican spokesman said the AT&T and Compucorp projects were worth more than $2 million, and that the GOP paid a fraction of that sum.

American Network Services, Inc. installed microcomputers at 46 hotels and the convention center to provide delegates with electronic mail and word processing services.

VMX, Inc. ran a voice-messaging service in which key convention staff members, delegation leaders and GOP officials were assigned voice mailboxes. Network users were able to dial others' mailboxes on telephones to leave messages several minutes in length.

Computer-generated graphics such as slides, transparencies and signs were provided by Executive Presentation Systems Corp. of Dallas.

M&D unveils communications system, report writer

CW AT M&D USER MEET

By Paul Gillin
CW Staff

WASHINGTON, D.C. — At the McCormack & Dodge Seventh Annual User Conference held here last week, M&D added a real-time office communications system and a report writer to its Millennium line of application products.

The office communications system, FYI:Millennium, is said to provide on-line message sending, receiving and tracking features without leaving the system environment. Sending features include a tickler function to notify a sender automatically when response to a message is due. The sender is also notified when a message is received and opened, M&D said.

A received message can be filed under user-defined categories with a cross-referencing capability based on key words. A response automatically invokes a history feature that links memo responses and counterresponses to track activity generated by the message.

FYI:Millennium also includes automatic system-to-user communications so that a message from the system is automatically generated when a certain criterion is reached. M&D said the feature can be used, for example, when a manager wants to know when a certain customer's account is overdue. Other features include real-time definition and maintenance of distribution lists, skeleton memo formats, a bulletin board that exploits all the response tracking options and compatibility with M&D's Secure security feature.

Passport:Millennium is a real-time matrix report writer with full financial and statistical capabilities integrated into the Millennium series, M&D said. It supports real-time creation and execution of report specifications. Data can be imported from Millennium or non-M&D files. A variety of display edit patterns are supported.

A spokesman said Passport:Millennium incorporates most features found in conventional spreadsheets with additional capabilities to call formulas and data from other work sheets. Recalculation is performed in a natural work sheet mode.

Passport:Millennium also features symbolic cell definition to reuse report specifications with varying data, a spokesman said. Windowing is available as is a variable printing capability that allows the user to execute report specifications on-line and send the results to a print file, providing on-line access to preprinted reports.

Report groups can be executed in a batch environment. Output transactions also can be created to maintain other applications without rekeying. Compatibility is offered with Lotus Development Corp.'s 1-2-3, enabling report specifications to be created within 1-2-3 and uploaded in real-time for execution on the mainframe, the company said. Standard formulas can be stored as macros with Passport:Millennium.

FYI:Millennium will be available in October at a price of $10,000. Passport:Millennium will be released in the first quarter of 1985 at a price of $25,000. M&D has not yet determined what price existing customers will have to pay for Passport:Millennium, according to Robert Weller, an M&D senior vice-president.

M&D is located at 1225 Worcester Road, Natick, Mass. 01760.

Ansi releases draft standards

WASHINGTON, D.C. — The American National Standards Institute's (Ansi) Committee on Information Processing Systems (X3) has released for public comment two draft proposed standards: one governing the interfaces between flexible disk cartridge drives and their host controllers, the other governing intelligent peripheral interfaces at the physical level.

Additionally, X3 put out for four-month comment a draft proposed standard on 7-bit coded character sets (7-bit Ascii) and specified a two-month comment period on a draft proposed standard on the revisions that are being proposed for the programming language Cobol, known as DPANS. X3.24-198x. Other actions taken by the committee include:

- Issuing a call for members to develop a U.S. draft standard for data encryption at the transport layer and the presentation layer of the International Standard Reference model.
- The formation of a Data Interchange Study Group to examine data and data interchange requirements for programming languages, office systems, open systems, interconnection, data representation, graphics, data dictionaries and data bases.

Information can be obtained from the X3 Secretariat, Computer and Business Equipment Manufacturers Association, Suite 500, 311 First St. N.W., Washington, D.C. 20001.

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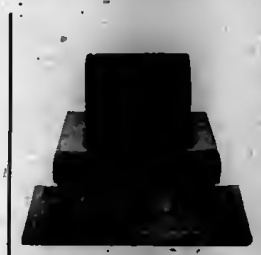

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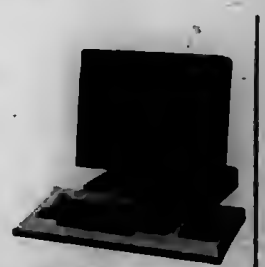

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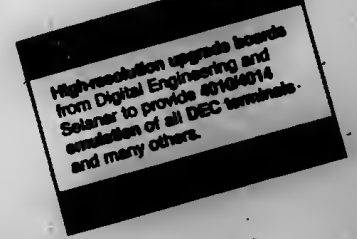
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Early user reaps productivity gains with M&D's M:SDT

CW AT M&D USER MEET

By Paul Gillin
CW Staff

WASHINGTON, D.C. — After considering and rejecting the fourth-generation language and data base management system option, *Newsday*, the major Long Island, N.Y., newspaper, chose to become a beta-site user for a system development tool from McCormack & Dodge Corp.

Newsday had never been a beta test site before, but decided to go with M&D's Millennium:SDT (M:SDT) application development product late last year in an effort to relieve its growing application backlog, according to William Ammann, business systems manager. Ammann was interviewed at M&D's Seventh Annual User Conference held here last week.

Newsday looked at Mathematica Products Group, Inc.'s Ramis and Pansophic Systems, Inc.'s Gener/OL, but opted for M:SDT because of the broad base of M&D applications the company had already installed, Ammann said. "Because SDT was tied in with existing products, our programming staff didn't have to become familiar with something new," he said. "M&D also told us SDT would require less memory because it would overlap with existing applications."

The two *Newsday* programmers who are now conversant in M:SDT recently completed their first project under the system. The dealer return application they wrote tracks newspapers that have been returned unsold from newsstand dealers. Its reports are used to build delivery schedules that can be used to minimize such returns.

CW Photo by P Gillin

Ammann

John Cassidy, a project manager at *Newsday* and one of the SDT programmers, said coding the application took about one-third as long as it would have taken under RPG II, the *Newsday* shop's standard programming language. "SDT is a very powerful and flexible programming language," he said. "You can do an awful lot with simple statements."

For example, Cassidy said, a user can write a single statement that instructs the program to look for a record on a file, test to see if fields are available, extract fields from a file and either continue or put out an error message. However, he noted that SDT is not very user-friendly. "It's not complex for a DP-oriented person, but I think most end users would get lost."

One of the best attributes of M:SDT is its editing features, Cassidy said. For example, a program written in Millennium's Procedure Definition Language (PDL) can compare information in multiple files, a feature that is useful for validation and error checking, he said.

Ammann added that Millennium itself includes a powerful and fairly easy-to-learn query language. He added that a major PDL benefit has been "the ability to build applications without having to know Cobol or command-level CICS."

However, Cassidy noted that the initial release of M:SDT also has some weaknesses. Its Filter Program is a Cobol batch program that is used to set up indexes for query functions. "We're not a big Cobol shop, and we've stumbled over that one several times," he said. "I'd like to see it put on-line."

Cassidy added that the editing features of M:SDT's screen-painting facilities could be improved. "It now creates three files after a screen has been painted," he said. "You can't go back and move things around and edit that way. You have to edit with table entries."

Nevertheless, M:SDT has become a popular item among *Newsday*'s programming staff, Cassidy indicated. "We have more people who want to get involved, but because of manpower restrictions, we have to hold back.",

Ammann added that the entire staff will gradually be trained in M:SDT.

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M&D calls Millennium 'cornerstone of product strategy'

Users applaud technology but worry about pace of product entries, conversion costs

CW AT M&D USER MEET

WASHINGTON, D.C. — The theme of last week's Seventh Annual McCormack & Dodge Corp.'s User Conference held here can be summed up in one word: Millennium.

That is the technology that M&D released last year to tie together all its applications software packages into an integrated, real-time unit with a consistent user interface. Under Millennium, all systems share common functions, although data is separate. Users can jump from one system to another without having to leave their work in progress, M&D said.

M&D emphatically said that Millennium is the cornerstone of its product strategy for the coming years. Because Millennium incorporates not only a consistent user interface, but also a full-scale application development and prototyping language, users can modify and add to their existing M&D software and still ensure integration, company officials said.

However, users interviewed by *Computerworld* at a session entitled "Introduction to Millennium Technology" expressed concerns that M&D's aggressive development strategy may cost them a lot of up-front money to convert to the new technology. While they heartily endorsed the Millennium concept, they said they wished that M&D would slow down new product announcements and allow existing users to get the products installed.

M&D has given users essentially no choice but to migrate to Millennium in the process of installing future product releases.

Millennium will soon be a standard part of all M&D application products, according to Robert Weiler, senior vice-president. The system includes many data base features without requiring the use of a data base management system, he said. Thus, users can query, extract and update data across the line of M&D products without having to know a different command syntax and without having to leave an application.

In addition, Millennium's data base capabilities result from the processes that are defined to it, according to John Landry, M&D executive vice-president. As a result, applications can be easily moved from one IBM environment to another. "Once you've moved Millennium, all applications move with it," Landry said.

While it is in the process of rewriting virtually all of its products in Millennium, M&D has made Millennium available as an on-line module on top of existing batch systems. This capability means M&D can "integrate almost anything," Weiler said. That ability will become increasingly important in the future, as M&D pursues its stated goal of dramatically expanding its range of applications software through development and acquisition.

"It gives us the capability to build complementary, but not yet full-blown applications quickly," Landry said. He added that some other products, such as the company's new FYI: Millennium electronic mail facility, emerge as natural and unexpected by-products of Millennium. "FYI was almost a brainstorm," Landry maintained.

Millennium is the major incentive behind M&D's newly stated push to increase revenues by 50% per year for the next two years and to be 10 times as large by 1990 as it is this year. Such goals are achievable if Millennium is used to integrate new packages into the M&D on-line environment quickly, according to M&D officials.

However, the company admits that introducing a new technology is a laborious task. M&D has given users essentially no choice but to migrate to Millennium in the process of installing future product releases. That strategy has some users worried.

"Not all the features [of Millennium] are necessarily a benefit to us," said Dale Reid, assistant manager of financial accounting and reporting at Teradyne, Inc. in Los Angeles. "In the short run, the costs of implementing the enhancements exceed the benefits."

Bruce Erickson, manager of system development at Zytron Corp. in Menlo Park, Calif., expressed a similar concern. "Software companies like to tout all their new features and enhancements, but don't tell the poor DP guy what's involved," Erickson said. "I'd like to know how much technical support [Millennium] will require."

John Taylor, a programmer/analyst at ITT Financial Corp. in St. Louis, said users will no doubt clamor for Millennium features, but it could be at the expense of the DP department. "The user community worries that they're getting behind, but our concern is that it takes so much [effort] to install," he said. "We wonder if we could help them more in another area."

Taylor asserted that M&D "is beating the hell out of everybody in the market," but wondered if, in the process, "they might beat the hell out of the customers as well."

Erickson said he would like to see assurances from M&D that the company's new technologies "will be around for a while. It's not the new releases that worry me; it's the rate of change," he said.

M&D officials have responded by assuring customers that they will be fully supported on releases of pre-Millennium products for at least a year after the Millennium versions are announced.

However, the company has stated that in the future, most enhancements will be directly related to Millennium features.

"The dollars are going to Millennium technology," Landry said. "A large part of our future is riding on Millennium."

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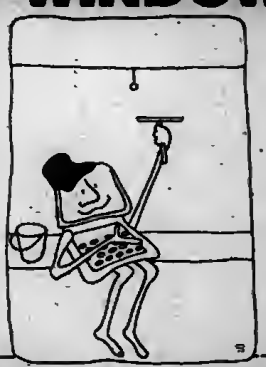

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M&D showcases its on-line demonstration network

CW photo by Paul Gillin

Large-screen projectors are used to display on-line demos at user conference.

CW AT M&D USER MEET

By Paul Gillin
CW Staff

WASHINGTON, D.C. — Seeing is believing, and McCormack & Dodge Corp. took pains at its Seventh Annual User Conference here last week to make sure users could see in action the software they came to discuss.

The temporary on-line network the company set up in the Sheraton Washington Hotel tied 24 conference rooms into the company's IBM 4341 computer at its Natick, Mass., headquarters. A total of $800,000 worth of equipment was employed, including 19 projectors and 30 IBM Personal Computers strung together by four miles of cable.

The company used 9.6K bit/sec communications over leased lines with two backup lines in reserve. Eight of the Personal Computers were linked together in an Ethernet-based local-area network that allowed the micros to communicate and share files, according to Hassen Baghal, microcomputer manager for M&D technical services.

On-line demonstrations have been part of M&D users conferences for the last five years, but this was the most sophisticated network yet assembled, M&D staff members maintained. Since M&D stresses the on-line features of its software, the capability to demonstrate it interactively is considered crucial, they asserted.

This year the demonstrations were heavily oriented toward PC Link, a real-time micro-mainframe communications product that M&D introduced last year, and Dunsplus, an integrated set of IBM Personal Computer software that includes PC Link.

PC Link was in constant use at a trade show booth brought to the conference by M&D. Registration was handled by networked Personal Computers tied to the mainframe in Natick. Even demonstrations of mainframe software were performed on micros in terminal emulation mode.

Early preparation

Five M&D staff members began setting up the Personal Computer network 11 days before the conference began, according to William Holland, M&D manager of communications.

The company secured a leased line from AT&T, but kept a backup line and a dial-up line in reserve. With the 4341 effectively dedicated to user conference activities, response times rarely exceeded 1½ seconds, according to Dean Redfern, director of computer services.

As an added safety net, M&D made its National Advanced Systems, Inc. AS 9060 mainframe at company headquarters available as an alternative demonstration machine in case the 4341 went down.

"The name of this game is backup after backup," Redfern said. "We have only one shot at this thing, and we can't afford to have the lines go down with all our users here."

Signals coming into the Personal Computers were split off from the red-green-blue output to projectors and displayed on large screens. Amplifiers were used to run up to four screen displays off a single Personal Computer, Baghal said.

Even if everything appears to be going all right, unforeseen problems can give the computer people fits, staff members said. At the M&D's users conference last year in San Francisco, the communications lines suddenly went down, Holland said.

The problem was eventually traced to a part of the hotel in which cable had been run through the kitchen. Someone had inadvertently severed the cable by using it as a makeshift doorstop. This year the cable was strung across ceilings and outside the building, Holland said.

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GE sends CAD/CAM models via video to remote sites

By Edward Warner
CW Staff

PITTSFIELD, Mass. — When General Electric Co.'s Plastics Division decided to construct a technology center here, it wanted state-of-the-art communications — the division's plants are spread across the country and overseas — and a computer-aided design and manufacturing (CAD/CAM) system that could go where few such systems have gone before.

GE executives here seem to think they've got what they wanted.

The technology center, which opened here this month, incorporates a video teleconferencing facility that can send engineering drawings and images from the center's CAD/CAM system to GE Plastics plants as far away as the Netherlands. The center's CAD/CAM system, meanwhile, is composed of workstations from several manufacturers — including GE's Calma Co. subsidiary — and is, according to GE, breaking new ground in the modeling of plastic parts.

The $25 million technology center is a sprawling, three-story building of glass and concrete set on a landscaped piece of land adjoining one of the division's plants. In the building are also housed the division's laboratories and a small plastics product production plant, where engineers can test the plastics being developed for the division's clients.

Work with clients

GE is not in the business of making plastic products; it sells the raw plastic, usually as pellets, to manufacturers. But because of the close relationship between the end use of a plastic product and the type of plastic with which it is made, GE Plastics' engineers work closely with their firm's clients to help them design products and the molds that will produce them, explained Dr. Gerald G. Trantina, manager of CAD technology for the Plastics Division.

This is where the technology center's CAD/CAM system comes in. In the technology center, engineers work at three terminals — an Evans & Sutherland Computer Corp. PS300, Lexidata Corp.'s Solidview and the Textronix, Inc. 4115 — and two Calma CAD/CAM workstations, linked with two Digital Equipment Corp. VAX-11/780 minicomputers. The VAX-11/780s run software that can, among other things, model products or parts and rotate or zoom in on those images — not an altogether unusual application in the world of CAD/CAM, Trantina admitted.

Where the CAD/CAM system gets its unique flavor, though, is in its ability to conduct stress analysis on plastics, which differ from metals and vary widely from each other in their reaction to stress, explained William R. Schlich, manager of GE polymer systems technology. "The use of CAD/CAM in the plastics industry is just coming of age," Trantina interjected. "I don't know if there are many places that are as far along as we are."

The key to the CAD/CAM system's ability to do stress analysis of plastics is its software, developed both in-house and by outside vendors, and the specifications that the division's clients provide for their products. Because the software for plastics stress analysis is so different from that used in the metals industry, where a direct line between stress and reaction exists, Schlich said, the division is careful about what it buys. Two packages currently in use, he noted, are Swanson Analysis Systems, Inc.'s Anasys and Adina Engineering, Inc.'s Adina.

Results shared

Once a product or a process is modeled on the technology center's CAD/CAM system, the result is often shared with other GE Plastics facilities, which will make the raw materials or do further design work with it.

The CAD/CAM center is currently linked, via a dial-up connection, to a GE Plastics plant in Selkirk, N.Y., and to the division's application design center in Detroit. Dial-up connections with all GE Plastics facilities in the U.S. are planned, Trantina said.

In the near future, Trantina added, the technology center's CAD/CAM system will also be able to communicate directly with GE Plastics facilities in Japan, via the General Electric Information Services Corp. network, and in Bergen op Zoom, a city in the Netherlands. The Netherlands connection is planned to take place via a 9,600 bit/sec leased line already in use for the technology center's video teleconferences with the Netherlands facility.

GE Plastics' technology center

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Film provided model for Nasa security breach, teen says

By John Gallant
CW Staff

HUNTSVILLE, Ala. — A recent breach of computer security at the National Aeronautics and Space Administration's (Nasa) Marshall Space Flight Center here appears to have been an alarming example of life mirroring art.

In a flurry of publicity surrounding the late-June computer system intrusions [CW, July 23], at least one of the four local teenagers suspected in the break-ins at Marshall reportedly boasted that the group used illegal access methods learned from the movie *War Games*. The youth told reporters that he and his companions used an automatic telephone dialing system and password bypass techniques depicted in that film.

A Federal Bureau of investigation spokesman said the automatic dialing system was among the home computer equipment seized by the agency from four Huntsville residences on July 16. The spokesman said the FBI also confiscated an IBM Personal Computer, a Commodore Business Machines, Inc, Commodore 64 and an Apple Computer, Inc. microcomputer and related peripherals, which the agency believes were used to tap into two Digital Equipment Corp. PDP-11/34 computers at the Nasa center in June.

Thomas Moore, special agent with the FBI's Birmingham, Ala., office, said that no arrests have been made to date in the continuing Marshall Center intrusion investigation. He said the FBI was nearing completion of its investigative report on the matter and will turn the report over to the U.S. Attorney's office in Birmingham. Moore said the U.S. Attorney may seek indictments against the youths, whose ages range from 13 to 15 years, when the state's grand jury reconvenes during the first week of September.

According to Moore, the teenagers — whose names the agency has not released — left notes for Marshall Center security officials on the computer systems they illegally accessed. "They left a message saying they were the 'top hackers' in the area and that officials would not be able to catch them."

Moore declined to comment on how the FBI traced the break-ins back to the Huntsville homes. He confirmed that at least two of the intrusions originated from the Randolph School, a private school in Huntsville, which three of the youths attend. The fourth teenager is a student at an unnamed Huntsville public high school. Moore said the intruders erased password access records maintained in the Marshall systems in an effort to discourage investigators.

According to one security analyst interviewed by *Computerworld*, the Marshall case is not the first incident of hackers adopting *War Games* techniques. "One of the so-called '414' group testified before Congress that the gang had been helped in its break-in attempts by that film. After seeing the movie, it is clear to me that it would be enough to give someone with a minimum of computer experience the knowledge needed to illegally access a computer," Anthony Caputo said.

Caputo is president and chief executive officer of Philadelphia-based Tact Technology, Inc., which manufactures computer access control devices. His mention of the "414" hackers is in reference to a group of Milwsukee — area code 414 — youths who penetrated a number of computer systems, including those at the Los Alamos (N.M.) National Laboratory nuclear weapons research center [CW, Aug. 22, 1983].

Caputo said a scene from *War Games* explicitly outlines the steps involved in programming a micro, equipped with an automatic dialing system and a modem, to dial systematically all telephone numbers within a given area code. He said the program involves writing all telephone numbers that are answered with a modem carrier tone to a micro file. Those stored numbers are then dialed by the intruder, who can utilize a variety of techniques to circumvent any password systems in place.

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IRS auditors test portables for on-site tax analysis

WASHINGTON, D.C. — The Internal Revenue Service this month put Grid Systems Corp.'s Compass portable computers in the hands of 16 field agents in Massachusetts in a test program that could pave the way for federal tax auditors nationwide to get portables for their on-site tax analyses.

The IRS Boston district office selected and took delivery of the Grid Compass portables last month, and now several auditors are using them in actual cases during the training phase, confirmed Peter Kszepka, chief of the information technology and resources office.

The goal is to replace hand-held calculators with personal computers that can perform spreadsheet analysis to speed up the audit process, according to IRS officials [CW, April 9].

Features

The Grid Compass configuration selected by the IRS comes with 512K bytes of random-access memory, 348K bytes of built-in bubble memory and 128K bytes of read-only memory expandable to 512K bytes.

The Compasses will use Grid software, including the Grid operating system, word processing, communications and forms generation software.

In addition, Grid will provide Microsoft Corp.'s MS-DOS operating system, Lotus Development Corp.'s 1-2-3 and a package for customizing applications to meet IRS needs.

IRS officials said the portables will greatly reduce the time it takes agents to produce an audit report, which now takes three to four hours. Kszepka said that at a recent demonstration the audit report was produced in 15 to 20 minutes with the portable computer, from input to printout.

System duties

Robert Pontbriant, the office's data service chief, said the computers will be used to compose appointment letters, store all the data needed to conduct the audit, compute complex tax formulas, store the audit results and exchange audit data with the host minicomputer while the agent is still on site.

Pontbriant said the Grid portable was selected after a competitive evaluation of more than 100 portables; he said it was chosen because it met IRS needs for computing power, portability, storage capacity and software.

Results of the 12-week pilot program will determine whether portables are purchased next year for all 12,000 general auditors and 5,000 specialist auditors.

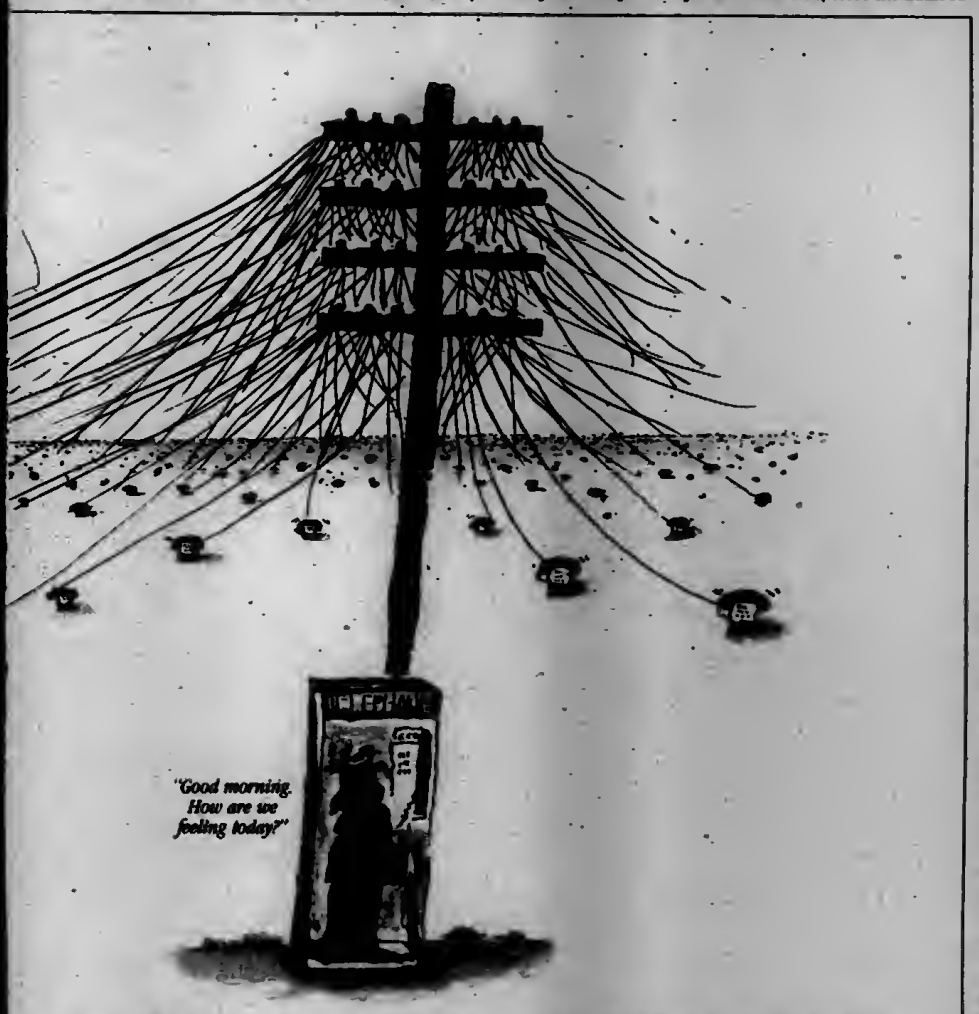
Ultimately, the IRS plans to establish a network, composed of fixed and portable computers, called the Automated Examination System to automate IRS audits fully, according to IRS officials here.

Design contract

In early September, the IRS plans to award the design contract for the system.

The second phase will place terminals and software in the hands of all auditors by September 1985, and the third phase will create the total integrated system by November 1987, including data communications and the applications programming selected in the design phase.

The IRS said that automation will relieve auditors of routine tasks, cut overhead costs, enable the IRS to audit more tax returns and produce audits of higher quality.



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FCC to rule on carriers' rates of return

WASHINGTON, D.C. — The Federal Communications Commission recently voted to open a regulatory proceeding — or rulemaking — to establish explicit methodologies and procedures for determining what the regulated rates of return should be for interstate long-distance carriers.

The rulemaking will ultimately affect the current 12.75% rate of return now allowed AT&T as well as interstate calls handled by local telephone companies whose boundaries cross state lines.

Too high

The FCC earlier this year formally expressed the view that it believes the current 12.75% rate of return may be too high.

The FCC is asking for public comment on establishing groupings of carriers for which rates of return should be prescribed by the FCC based on the grouping and on whether the cost of equity should be the primary determinant in the rate of return.

The FCC said that because AT&T's divestiture has led to changed industry conditions, "more individualized prescriptions of rates of return now may be in the public interest."

However, the FCC noted that it could be swamped with 1,400 rate proceedings, and it wants the rulemaking to establish more efficient ways to handle the potential burdens.

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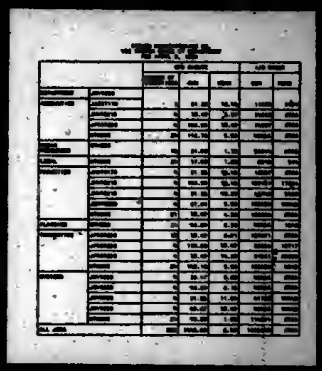

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NEWS

Sting operation recovers stolen chips

HUNTSVILLE, Ala. — A "sting" operation, begun by state authorities following an anonymous tip, led to the recovery of approximately $70,000 worth of stolen semiconductor chips last month.

The semiconductor parts were taken from SCI Systems, Inc., a computer component, system and terminal manufacturer based here, according to Chief Deputy Charles Norment of the Madison County Sheriff's Department.

Norment said the Alabama Bureau of Investigation (ABI) received a confidential tip from someone who said that certain individuals had attempted to sell the stolen chips. The ABI and the sheriff's department then set up a "sting" operation in which an undercover agent paid between $10,000 to $26,000 to one man for the chips, he said.

SCI uses Intel Corp. chips in the assembly of its computers. Nearly 600 stolen chips were recovered, along with the money from the sale.

Three men were arrested in the "sting" operation. One of those arrested, Russell Roberts of Guntersville, Ala., was an SCI employee, authorities said. He was charged with one count of first-degree receiving stolen property.

Jack W. Keeler of Crossville, Ala., was charged with two counts of receiving stolen property. Billy Webb of Huntsville was charged with conspiracy to receive stolen property.

The three men each posted $1,500 bail and were scheduled to appear at a recent preliminary court hearing.

An SCI spokesman declined to discuss details of how the chips were stolen or whether any additional security precautions have been taken by SCI as a result of the incident.

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NORCROSS, Ga. — "Increasing Your Personal Industrial Engineering Effectiveness," a two-day seminar sponsored by the Institute of Industrial Engineers (IIE), is designed for those workers who want to learn current industrial engineering tools and techniques.

The seminar is scheduled for Sept. 10-11 in Minneapolis, Oct. 26-27 in Atlanta and Nov. 12-13 in Los Angeles.

Topics scheduled for discussion are interpreting an assignment, selecting and implementing various development techniques, myths of productivity improvement and obtaining top and middle management commitment and support.

Seminar leaders include Charles E. Geisel, corporate manager for industrial engineering at Container Corp. of America; Gerald Nadler, chairman of the department of industrial and systems engineering at the University of Southern California; and David Ralston, director of organizational development at Holy Cross Hospital in Salt Lake City.

The registration fee is $435 for IIE members or $495 for nonmembers. IIE is located at 25 Technology Park/Atlanta, Norcross, Ga. 30092.

FMHA on-line system aims to speed emergency loans to U.S. farmers

By David Olmos
CW Staff

KANSAS CITY, Mo. — Reducing the time it takes to get emergency loans to farmers devastated by flood, drought or other natural calamities is the major aim of a new information processing center opened here this month by the Farmers Home Administration (FMHA).

The FMHA — the lending arm of the U.S. Department of Agriculture — unveiled its IBM mainframe-based system in a ceremony Aug. 10, culminating a complicated 2½-year conversion from an aging Burroughs Corp. system. The conversion also involved the relocation of the computer center from St. Louis to Kansas City.

"Rural Americans hit by disasters will benefit from faster response to their credit needs," declared Secretary of Agriculture John R. Block. "Handling time from the date of loan approval to the time of funds availability to the borrower will be more than halved."

The system was designed to allow implementation of remote terminal inquiry and data entry capability for the agency's 1,900 county offices and 270 district offices by 1987. Forty-six state offices already have on-line access to the newly installed IBM 3081-K mainframe in Kansas City.

Eliminate bottlenecks

FMHA officials said the remote capability will eliminate past bottlenecks in which county offices mailed loan papers to the St. Louis office, where the information was entered by means of key-to-disk data entry and then transferred through batch processing to the computer system. The mailing time alone usually took a week, and if corrections were necessary, the process began over again, they said.

"This will give us, for the first time, an on-line capability to answer questions about a farmer's or homeowner's account on-line when he comes into the office," maintained FMHA Administrator Charles W. Shuman. "It's going to make a dramatic difference."

The FMHA processes roughly 17 million financial transactions each year and provides services to about 1.5 million borrowers.

The decision to convert to a new system dates back to 1981, when the agency was using medium-scale Burroughs computers. Rapid growth and a desire to provide on-line computing capability to field offices nationwide made a conversion inevitable, according to Larry Miller, project director at the computer center.

"We knew we couldn't expand our capability to the field offices based on the amount of horsepower we had with the Burroughs system," he said.

Moreover, the Agriculture Department had announced its intention to phase out the FMHA's St. Louis computer center in order to consolidate the data processing requirements of several agencies at the Kansas City facility.

Another consideration, Miller said, "was that our terminal software on the Burroughs system was really a homegrown type, not a standard teleprocessing monitor." The agency wanted to switch to a "more standardized software," he said, and decided on Cullinet Software, Inc.'s IDMS/DC teleprocessing monitor and IDMS data base program. The IDMS program had been selected by the Agriculture Department as the primary data base program for IBM systems, he noted.

"The general operation of the computer center has gone very smoothly, considering the magnitude of the effort," Miller said, adding that approximately one million lines of Cobol code had to be converted.

Shuman believes the electronic handling of transactions will allow FMHA agents more time to provide personal care to borrowers. "That is our most important job," he said. "That is what we should be doing."

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NEWS

Hobbyist tactic brings free software to Merrill Lynch

By Edward Warner
CW Staff

NEW YORK — Kenneth Edelstein is a sysop, and he gets paid for it. A sysop, for those unfamiliar with hackerspeak, is short for systems operator, a personal computer user who operates an electronic bulletin board that can be accessed by other micro users.

Edelstein's six-week-old bulletin board, called Microshare, provides a library of public domain software that can be downloaded at no cost to anyone who logs on. So far, 80 different users have done so. Microshare's potential users, though, are not the bleary-eyed computer hobbyists who frequent such bulletin boards, but the hundreds of Merrill Lynch Pierce Fenner & Smith managers and executives with personal computers on their desks.

Edelstein

Edelstein operates Microshare as part of his job as manager of microcomputer support for the Merrill Lynch Information Services Center's time-sharing service, a service to which both terminals and microcomputers can be linked. The bulletin board, not a part of the time-sharing service, carries 244 programs — everything from games to graphics programs and utilities. Merrill Lynch employees from across the U.S. have found they can, for the price of a telephone call to the brokerage firm's New York headquarters, dial up Microshare and download free software via a modem to their desktop computers.

"It's kind of unnerving to some people," Edelstein said. Unnerving or not, he said, Microshare serves an important function in the firm's system of microcomputer support. It gives users familiarity with their communications software, which proves useful when they log on to the time-sharing system; it provides an electronic message board for users to communicate with one another; and, most importantly, it offers useful software free to Merrill Lynch users at a time when the firm is under a cost-containment program.

Among the more useful programs residing on the bulletin board is Personal Computer Picture Graphics, a 300-picture collection of electronic stock art that can be cut and pasted into users' reports — a program Edelstein called "one of the best items available in the public domain." Also available are Extended Batch Language, a batch utility for the IBM Personal Computer; and a set of utilities and tutorials for Lotus Development Corp.'s 1-2-3 spreadsheet, which Edelstein said is one of several programs in the library that have similar counterparts in the commercial marketplace.

Most of the free software on Microshare was downloaded by Edelstein from the electronic bulletin boards of computer hobbyists or gained in arrangements with computer clubs under which Microshare and the clubs exchange their entire libraries, Edelstein explained. Even the software that operates Microshare, the Remote Bulletin Board Service from Capital PC Software Exchange, was itself downloaded gratis from another bulletin board. The system "bootstrapped itself," he said.

Many of the more sophisticated programs on Microshare come with a request from their authors for contributions, between $5 and $30, if the user downloads their software. The contribution is a good investment, Edelstein said. "If you ever looked in my checkbook, you'd see a series of $5, $10 [and] $15 checks have been written to software authors," he said, adding that he often encloses a blank, formatted diskette and return postage with his check. In return, he gets back the latest version of the program and often several good new programs as well.

A microcomputer hobbyist himself, the energetic Edelstein said he is always ready to adopt the good ideas — such as bulletin boards — that arise among hobbyists for use in his work supporting the Merrill Lynch micros that use Information Services. He reads the hobbyist magazines for new or overlooked products, and he said he sees one of his duties as being "a kind of sniffer-outer of things," especially good deals in software, such as a $25 "superutility" for file retrieval that he said he is testing and may offer, at cost, to the company's micro users.

Microshare's hardware, a 640K-byte IBM Personal Computer with a 10M-byte hard disk and two 360K-byte diskette drives, sits to the side of Edlestein's desk, always within arm's reach. As his day progresses, he can glance up and watch Microshare users log on and search its directory.

First-time users will often pull down a game and later move to downloading utilities or applications, such as Microshare's public domain word processor. When they start using Microshare extensively, Edelstein said, he asks them to consider uploading some public domain software to help the bulletin board grow. "I sort of cajole them by sending them messages saying that 'it is better for the soul to give [than receive],' " he joked. "The real goal of [Microshare] is user participation."

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HARDWARE ROUNDUP

A Look at 63 Systems From 19 Vendors

Once viewed as a dying ember, the minicomputer has been kept warm, at least temporarily, by the ever-changing computer system marketplace.

Three trends have developed which may extend the lifespan of minicomputers. The first trend is the reluctance of the huge installed base of traditional minicomputer users to switch over to larger superminicomputers or mainframes. Industry analyst Maureen Fleming, of International Resource Development Corp. in Norwalk, Conn., noted that existing minicomputer users often find it more economical to install more minicomputers than to foot the high conversion costs often associated with migration to another computer system architecture.

Secondly, some dissatisfied users of microcomputers have decided they need systems capable of providing more power, a common data storage facility and the ability to support multiple users. While minicomputers seem to be the ideal solution for these needs, the trend has also given a spark to a new type of system, the supermicrocomputer, to provide more competition for the already embattled minicomputer. IRD's Fleming noted that micro users who have determined they need more power or additional capabilities seem to shy away from minis because they think the systems are too complex. Lastly, said the Yankee Group's Dale Kutnick, the quest for the micro-to-mainframe link has opened up yet another market for minicomputers — as file servers in large computer networks.

Last year, the minicomputer segment of *Computerworld*'s Hardware Roundup listed characteristics of 59 systems from 20 vendors. This year, 63 systems from 19 vendors have been listed.

Contributing to this report were CW staff writers James Connolly, John Desmond and Tom Henkel.

The minicomputer section of the Hardware Roundup lists processors manufactured by the top 19 vendors. These companies were determined by 1983 revenue data supplied by International Data Corp. in Framingham, Mass.

The format for the minicomputer (and next week's microcomputer) segments of the Hardware Roundup is different from the format used in last week's mainframe and supermini installment. The reason for the change is that users of minicomputers seek different information from mainframe users when deciding which computer system to buy. For example, raw performance information can be more useful to the DP executive who has to supply computing power to many diverse users. Buyers of minicomputers, on the other hand, usually purchase systems to solve a specific set of business problems. For them, many industry analysts contend, performance data is not as essential.

It should be noted that the Hardware Roundup is not intended to be used as a buyer's guide. *Computerworld* does not endorse any vendor's product, architecture or methodology. Most of the information included in these charts has been vendor supplied. Unless otherwise noted, all the information contained in the Hardware Roundup should be considered to be the vendor's claims.

HARDWARE ROUNDUP

HONEYWELL, INC.

Characteristics \ System	DPS 6/40	DPS 6/45	DPS 6/75	DPS 6/95
Communications Protocols	Asynchronous, Synchronous	Asynchronous, Synchronous	Asynchronous, Synchronous	Asynchronous, Synchronous
Purchase Price (Basic Configuration)	$27,000[1]	$47,325[2]	$62,500[3]	$119,450[4]
I/O Ports	to 32	to 32	to 96	to 128

1. Includes CPU, console and 40M-byte disk drive, 5¼-in. diskette drive.
2. Includes CPU, 40M-byte disk drive, 5¼-in. diskette drive, 400 char./sec printer, six workstations.
3. Includes CPU, 80M-byte disk drive, 5¼-in. diskette drive, 300 line/min printer.
4. Includes CPU, 256M-byte disk drive, 5¼-in. diskette drive, 600 line/min printer.

IBM

Characteristics \ System	Series/1	System/23 Datamaster	System/38
Communications Protocols	Synchronous, Binary Synchronous, Asynchronous, SDLC	Asynchronous, Binary Synchronous, SDLC	Binary Synchronous, SDLC/SNA
Purchase Price (Basic Configuration)	$30,000	$9,705	$34,000
I/O Ports	Not Available	5	10

1. Depending on the CPU.

HEWLETT-PACKARD CO.

Characteristics \ System	HP 300	HP 1000 Model 5 Minicomputer
Communications Protocols	Synchronous, Asynchronous	Asynchronous, HDLC
Purchase Price[1] (Basic Configuration)	$15,250	$4,750
I/O Ports	5	8

1. Base list price.

BURROUGHS CORP.

Characteristics \ System	B26	B86[1]	B830[1]	XE-630
Communications Protocols	Binary Synchronous, SDLC, HDLC, X.21, X.25, P/S	Binary Synchronous, Asynchronous, Synchronous, SDLC, HDLC	Binary Synchronous, Asynchronous, Synchronous, SDLC, HDLC	Binary Synchronous, SDLC, HDLC
Purchase Price (Basic Configuration)	$3,850 (256K)	$28,445 (512K)	$23,228 (640K)	$26,180 (1M)
I/O Ports	4-11	7-10	9[2]	6-22

1. The B86 and B830 employ a virtual address space with a logical maximum of 24 bits. The processor, however, employs an 8-bit architecture.
2. Since between four to eight systems can be grouped in a multiprocessor configuration, the maximum number of I/O ports can vary greatly.

WANG LABORATORIES, INC.

Characteristics \ System	VS 15	VS 25	VS 45
Communications Protocols	WSN* Transport; Wangnet; Wangnet's Wang Band; General Asynchronous; 2780/3780, 3271 Binary Synchronous; SNA/SDLC; VS-Hasp; TTY	WSN* Transport; Wangnet; Wangnet's Wang Band; General Asynchronous; 2780/3780, 3271 Binary Synchronous; SNA/SDLC; VS-Hasp; TTY	WSN* Transport; Wangnet; Wangnet's Wang Band; General Asynchronous; 2780/3780, 3271 Binary Synchronous; SNA/SDLC; VS-Hasp; TTY
Purchase Price (Basic Configuration)	$13,500	$25,000	$26,000
I/O Ports	6	6	6

* Wang Systems Networking.

DIGITAL EQUIPMENT CORP.

Characteristics \ System	Micro PDP-11	Micro PDP-11/73	PDP-11/23	PDP-11/23+	PDP-11/24	PDP-11/44
Communications Protocols	Synchronous, Asynchronous	Synchronous, Asynchronous	Synchronous, Asynchronous	Synchronous, Asynchronous	Synchronous, Asynchronous	Synchronous, Asynchronous
Purchase Price (Basic Configuration)	$7,300	$7,800	$12,000	$20,000	$30,000	$60,000
I/O Ports	1	1	1	1	1	1

1. With Q-bus.
2. With Unibus.

HARDWARE ROUNDUP

BASIC FOUR INFORMATION SYSTEMS DIVISION, MANAGEMENT ASSISTANCE, INC.

Characteristics \ System	System 110/210
Communications Protocols	Synchronous
Purchase Price[1] (Basic Configuration)	$47,510
I/O Ports	2

1. For a system with 96K bytes of main memory; a 28M-byte disk drive and three terminals.

TEXAS INSTRUMENTS, INC.

Characteristics \ System	Business System 600	Business System 800
Communications Protocols	SDLC, 3270, 2980, X.25, Ethernet	SDLC, 3270, 2980, X.25, Ethernet
Purchase Price (Basic Configuration)	$25,400	$46,800
I/O Ports	16	40

NIXDORF COMPUTER CORP.

Characteristics \ System	8889	8890	8870
Communications Protocols	Binary Synchronous, SNA/SDLC	Asynchronous, Synchronous	Asynchronous, Synchronous, X.25
Purchase Price (Basic Configuration)	$27,500	$18,000	$13,500
I/O Ports	Not Available	Not Available	1-24

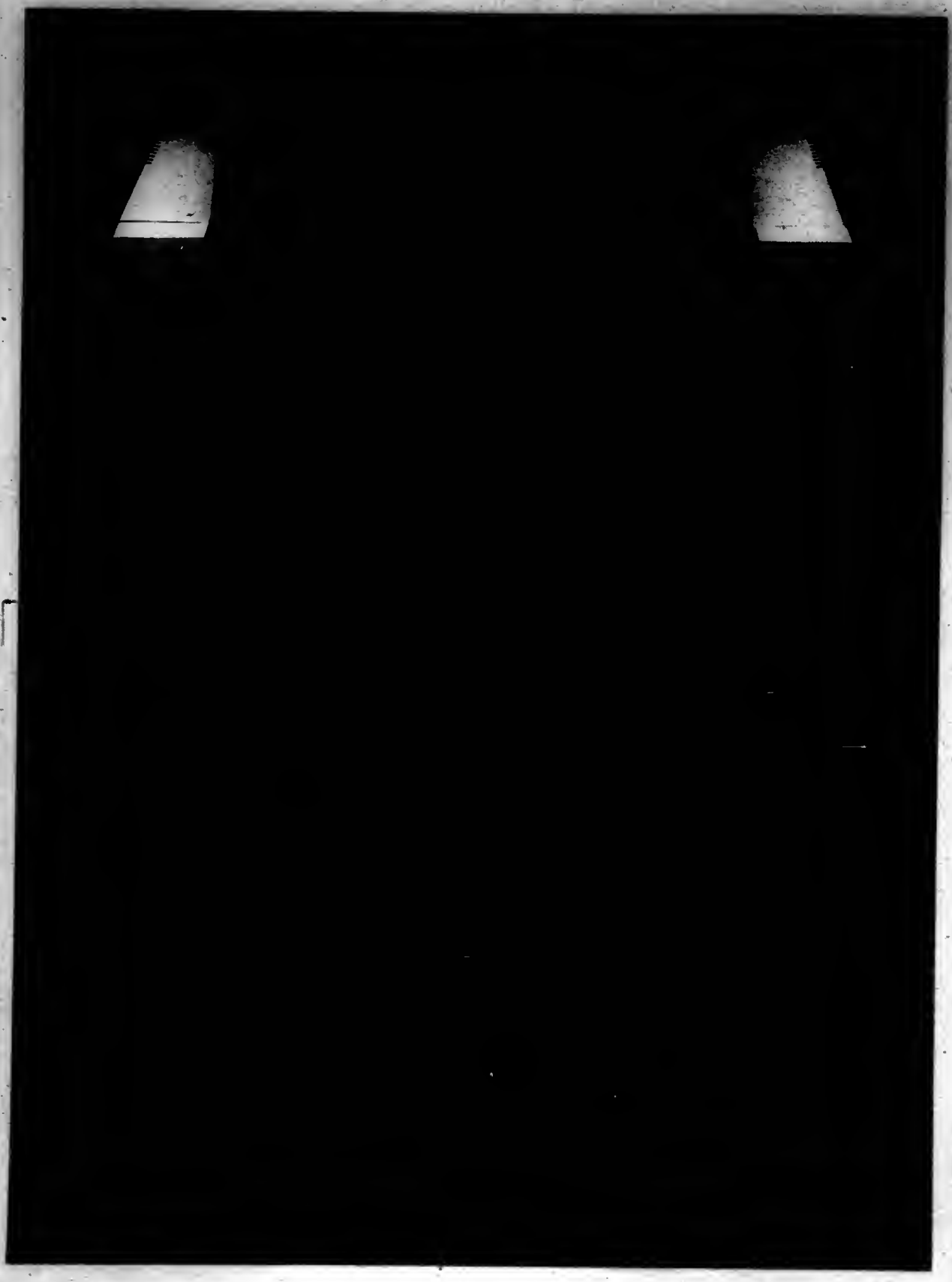
POINT 4 DATA CORP.

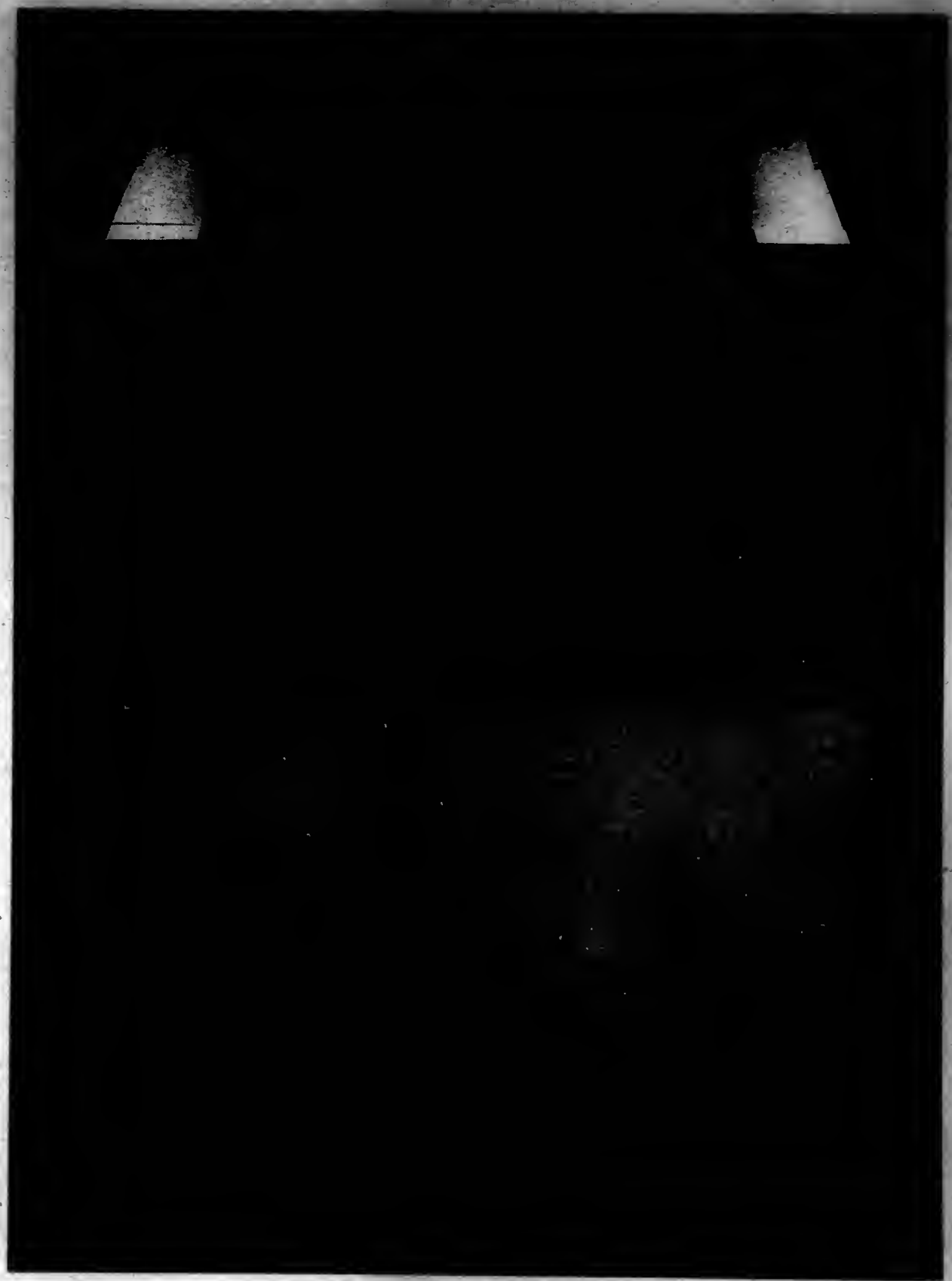
Characteristics \ System	Mark 27	Mark 3	Mark 6	Mark 9
Communications Protocols	Asynchronous	Asynchronous	Asynchronous	Asynchronous
Purchase Price (Basic Configuration)	$8,995	$13,980	$26,700	$39,900
I/O Ports	To 7	To 7	To 126	To 126

1. Interactive real-time information system.

FOUR-PHASE SYSTEMS, INC.

Characteristics \ System	IV/40	IV/50	IV/60	IV/65	IV/70	IV/80	IV/90	IV/95
Communications Protocols	Asynchronous, Synchronous, Binary Synchronous, Hasp, SDLC	Asynchronous, Synchronous, Binary Synchronous, Hasp, HDLC	Asynchronous, Synchronous, Binary Synchronous, Hasp, SDLC	Asynchronous, Synchronous, Binary Synchronous, Hasp, SDLC	Asynchronous, Synchronous, Binary Synchronous, Hasp, SDLC	BSC, X.25, Asynchronous, SNA/SDLC	BSC, X.25, Asynchronous, SNA/SDLC	BSC, X.25, Asynchronous, SNA/SDLC
Purchase Price (Basic Configuration)	$35,713	$48,934	$68,205	$79,818	$75,261	$85,124	$75,597	$112,039
I/O Ports	3	3	36	39	3	39	24-39	39





HARDWARE ROUNDUP

MDS QANTEL CORP.

Characteristics \ System	Model 64	Model 40/4	Model 10/2	Model 40/2	Model 20/2
Communications Protocols	Asynchronous, BSC, Hasp, IBM 2780/3780, 3270, 3740	Asynchronous, BSC, IBM 2780/3780, 3270, 3740	Asynchronous, BSC, IBM 2780/3780, 3270, 3740	Asynchronous, BSC, IBM 2780/3780, 3270, 3740	Asynchronous, BSC, IBM 2780/3780, 3270, 3740
Purchase Price (Basic Configuration)	$180,050	$78,100	$16,950	$69,600	$31,600
I/O Ports	16	15	5	6	6

1. MDS Qantel uses an I/O bus, not an I/O channel.

CONVERGENT TECHNOLOGIES, INC.

Characteristics \ System	Miniframe	Megaframe
Communications Protocols	Asynchronous, Binary Synchronous, SNA, X.25	Asynchronous, Binary Synchronous, SNA, X.25
Purchase Price (Basic Configuration)	$4,750[1]	$32,902[2]
I/O Ports	To 16	To 128

1. Quantity of 100.
2. Quantity of 20.

DATAPOINT CORP.

Characteristics \ System	Datapoint 1800	Datapoint 8800
Communications Protocols	2780, 3780, 3270, Datapoint, TTY emulators	SNA/SDLC, 3270, 3780, Datapoint, Multilink
Purchase Price (Basic Configuration)	$2,400	$8,950
I/O Ports	4	4

TANDEM COMPUTERS, INC.

Characteristics \ System	Nonstop 1+	Nonstop II
Communications Protocols	Asynchronous, Synchronous, Binary Synchronous, SDLC, HDLC, Hasp, ADCCP, 2780/3780, 3270	Asynchronous, Synchronous, Binary Synchronous, SDLC, HDLC, Hasp, ADCCP, 2780/3780, 3270, Tinet, Burroughs Corp. Poll Select, NCR Corp. Poll Select
Purchase Price (Basic Configuration)	$122,000	$195,000
I/O Ports	To 256	To 256

ALTOS COMPUTER SYSTEMS, INC.

Characteristics \ System	580	586	986
Communications Protocols	Asynchronous, Bisynchronous, 3270/3276	Asynchronous, Bisynchronous, Worknet	Asynchronous, Bisynchronous, Worknet
Purchase Price (Basic Configuration)	$4,490	$8,990	$12,990
I/O Ports	4	6	10

HARDWARE ROUNDUP

NCR CORP.

Characteristics \ System	Tower 1632	I-Tower
Communications Protocols	Asynchronous, Bisynchronous 2780/3780, TTY, SNA/SDLC	Asynchronous, Bisynchronous 2780/3780, TTY
Purchase Price (Basic Configuration)	$12,945	$24,245
I/O Ports	8-16	8-16

MICRODATA CORP.

Characteristics \ System	M4000	M7000
Communications Protocols	Asynchronous, Bisynchronous	Asynchronous, Bisynchronous, Synchronous
Purchase Price (Basic Configuration)	$27,000[1]	$40,000[2]
I/O Ports	Not Available	Not Available

1. Includes 64K bytes of random-access memory, 1,600 bit/in. streaming tape drive, 32M-byte disk subsystem, eight I/O ports.
2. Includes 64K-byte file processor, 10M-byte disk, 100 in./sec streaming tape drive, eight terminal ports.

NEC INFORMATION SYSTEMS, INC.

Characteristics \ System	Astra 210	Astra 220	Astra 300 VS	Astra 350 VS	Astra 370 VS
Communications Protocols	Asynchronous, Synchronous, 3780	3270, 3780, 3770, SNA, HDLC, X.25	3270, 3780, 3770, SNA, HDLC, X.25	3270, 3780, 3770, SNA, HDLC, X.25	3270, 3780, 3770, SNA, HDLC
Purchase Price (Basic Configuration)	$8,000	$12,000	$15,000	$20,000	$25,000
I/O Ports	3	7	13	18	27

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Location	Date
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3. Chicago, IL	September 14, 1984
4. Boston, MA	September 20, 1984
5. Washington, DC	September 25, 1984
6. New York, NY	October 4, 1984
7. San Francisco, CA	October 11, 1984

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8:30 – 9:00 Registration & Coffee
9:00 – noon *"The World of Artificial Intelligence"*

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Dade County cleans up its waste pickup billing system

Restructured procedure rounds up 4,000 additional home owners

By Donna Reimundi
CW Staff

DADE COUNTY, Fla. — Since 1982, Dade County's yearly property tax bills have included a charge for twice-weekly waste pickup. Except, that is, for those of the initially lucky, but ultimately unfortunate 4,000 property owners whose bills never reflected the trash tariff.

Ben Guilford, director of solid waste in Dade County, said that the solid waste department did a manual check of its records, compared the results with the computerized bills and discovered that up to 4,000 home owners had not been billed since the county's computer system started adding the waste bills to the property taxes.

One reason for the foul-up was that some condominiums were being charged as if they were one dwelling, even though there were multiple units, he said. In other cases, homes had changed owners, and the new owners were not added to the billing system.

Guilford said the waste department does detective work on the streets to try to prevent that sort of oversight. Waste department personnel watch developments to check for new houses and try to ascertain whether dwellings are occupied and the owners are receiving bills for their services.

Missing charges stay unreported

Guilford called it interesting that out of the 4,000 unbilled people, not one called to report a missing trash charge, even though the amount is itemized and clearly defined in the tax bills.

Guilford met with the Office of Computer and Information Services, the county agency that runs the billing program. He said the problems have been identified, and solutions are being considered. "This is not an insurmountable problem," he said. "I'm sure we have it licked."

According to the DP unit administrator, Richard Talle, who is responsible for the development of automated systems in Dade County, none of the problems were program-oriented.

Procedures had been set up for waste department personnel to define accounts and get them into the system, but the procedures weren't always useful, and waste department personnel often didn't find out about new accounts in a timely fashion.

A short-term solution should be implemented by Oct. 1 that will identify and cross-match records between various files to ensure that they have also entered the waste department file. Reports will be issued to the waste department to alert it to new clients.

Long-term solution

A long-term solution consists of sending information electronically to the waste department from the building and zoning system, rather than from the tax system, which often does not have information until some time after a residence is built and occupied. This way, the department will be alerted much earlier so it can investigate a residence — because of the way the system will be set up — and decide whether to delete the account or keep it.

In the meantime, individual property owners find themselves with bills ranging from $202 to $572, and owners of multiple properties are being hit with bills in the thousands of dollars.

Guilford said he understands that these bills are difficult for people to pay all at once, and he is working on a plan to allow installment payments.

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IIE seminars set for fall

NORCROSS, Ga. — "Manufacturing Challenge: Creating the Automated Factory," a two-day seminar sponsored by the Institute of Industrial Engineers (IIE), plans to address the problems of integrating factory components.

The seminar will be held in Chicago Sept. 13-14 and San Francisco Sept. 24-25.

The seminar leader will be James A. Tompkins, president of Tompkins Associates, Inc., a consulting firm specializing in facilities planning, material handling, warehousing and factory automation.

The seminar is scheduled to discuss the automated factory, state-of-the-art factory facilities, the benefits of automation, factory design criteria and system planning and implementation, according to seminar planners.

The registration fee is $425 for IIE members. For nonmembers the registration fee is $485.

Additional information is available from IIE, which is located at 25 Technology Park/Atlanta, Norcross, Ga. 30092.

Georgia police's DBMS identifies rape suspect in four hours

By James Connolly
CW Staff

ATLANTA — One woman had been raped and another assaulted by a knife-wielding kidnapper, and Georgia police had only a general description of the man and his truck on which to act if they were to catch him before he struck again.

Detectives recently turned to a computer to help solve the July crimes, and within four hours they had in hand the name of a suspect who was subsequently arrested and charged.

The four-hour turnaround time on the detectives' information request was helped by a Sperry Corp. 1100/82 mainframe run by the Georgia Crime Information Center here and equipped with Sperry and home-developed data base management and English-like query and retrieval systems.

The two victims of separate July incidents told police they were kidnapped by a man in a pickup truck who rammed their cars off the road and forced the women into the truck in separate incidents in Pike and Henry Counties in central Georgia. The first woman escaped after being forced to disrobe, and the second woman was taken through several counties and was reportedly raped.

Both women gave police physical descriptions of the man and truck. One victim said the man told her he had been imprisoned for drug and forgery convictions.

It was that information that programmers fed into the computer, searching for possible matches in a data base containing 750,000 names and in motor vehicle registration files.

"It was fantastic work. This is the first time I've seen this dramatic a result in putting together parameters like this with a description, the vehicle and a record," said Jack White, an agent for the Georgia Bureau of Investigation.

Programmers using Sperry UTS 400 terminals entered data such as the suspect's race, height, weight and distinguishing marks using prompts from Sperry's QLP Facility, according to Ed Manseau, deputy director of the Georgia Crime Information Center. The 11-year-old data base, with information dating back to the 1940s, was built and maintained by key-to-tape entry of the names, descriptions and method of operation of every person arrested in Georgia.

The system, which includes Sperry's DMS 1100 data management software, printed out a list of 2,532 sex offenders who matched the attacker's physical description. A second query narrowed that list to 50 names of suspects who also had drug and forgery convictions, according to Manseau.

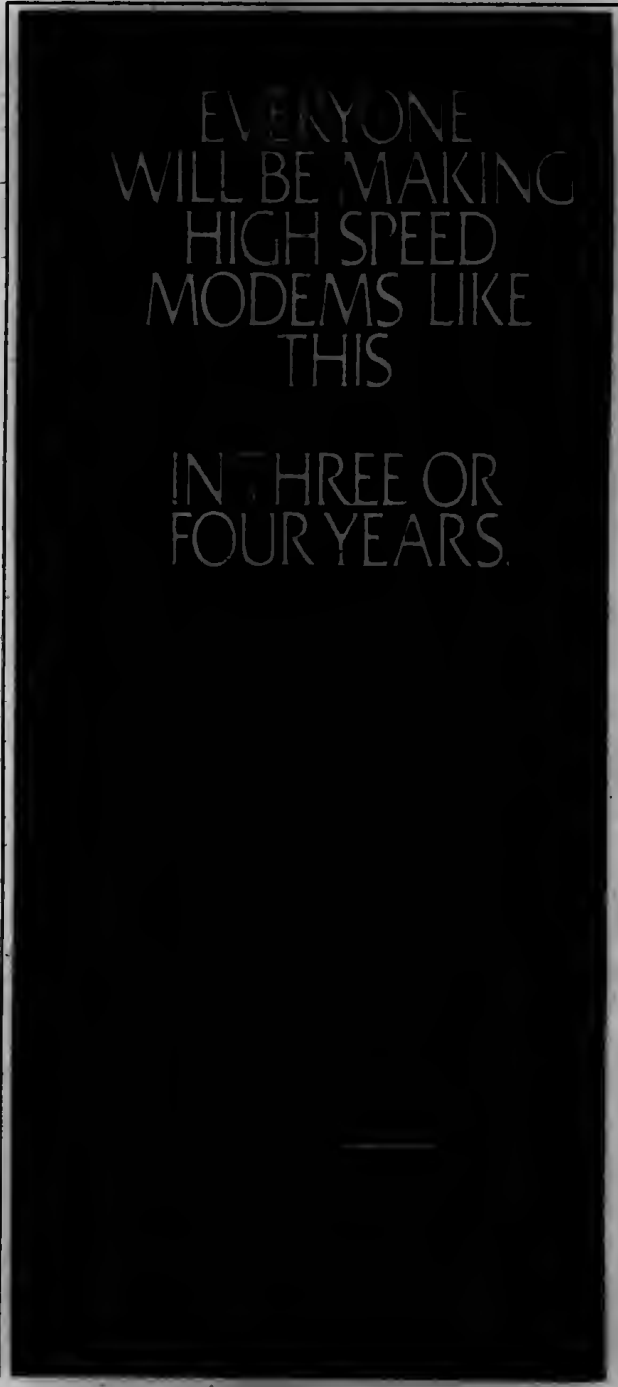
The third phase of the operation involved the home-developed Golden Retriever system, which drew from motor vehicle registration files a list of 600 owners of 1975 to 1978 Dodge pickups in the eight counties near the sites of the crimes.

Manseau said a manual check of the last two lists soon gave detectives a match with the name of Richard Chambley of Griffin, Ga. Chambley was arrested and charged in several counties with a variety of sex crimes, assaults and kidnapping in the two incidents.

Manseau said the Crime Information Center's system is not unique. He said most states now offer similar services to police, but that the Chambley case ran particularly well. He said the center handles about 1,000 cases like the Chambley investigation each year.

"You really have to have sharp discriminators when you make a request. There just was enough information here to do that," he explained.

He added that the center is encouraging more investigators to use the data base, which received heavy use several years ago when the Atlanta area was hit by a string of murders of young black people.



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In September, see us at the Federal Computer Conference and TCA.

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Brazil garners opinions on copyright protection

By F. Paul Maloof
Special to CW‡

BRASILIA — Late last June, the government of Brazil sponsored a conference to wrestle with the slippery subject of computer software copyright laws. Participants from Brazil, including officials from the Special Secretariat of Informatics (SEI) and the National Institute of Industrial Property, played host to software legislation experts from the U.S., Japan, Hungary and West Germany.

The purpose of the conference was to harvest world opinions on how to improve Brazil's copyright protection laws. Brazil presently maintains copyright protection under basic contract law — a relatively antiquated system in the face of rapidly developing worldwide computer technology. Brazil has become well aware of the fact that innovations in computer software seriously challenge the existing protection under the law of contracts.

The Americans, Hungarians and West Germans at the conference generally agreed that software should be classified as intellectual property and given 50 years of protection under the principles of international copyright law.

The Japanese, however, voiced the opinion of their Ministry of International Trade and Industry, which limits the protection of software to 15 years while requiring mandatory registration of software programs. Japan currently has no official statute on the subject, and the only protection developers of software enjoy is the ability to file a lawsuit. As a result, at least 44 such suits are pending in Japanese courts.

Meanwhile, the Brazilian Lawyers' Association proposed that software be protected for a 10-year period and that a mandatory registration system be established for all computer software.

Another point of view, which was not vocally expressed at the conference, but overshadowed the meetings, was legislation previously introduced here April 3 by Brazil's Sen. Roberto Campos. Campos' proposal called for abolishing the SEI, replacing the computer industry market reserve provision with a tariff system, allowing foreign manufacturers a right to equity participation in up to 49% of joint ventures and creating a national council to develop overall informatics policy. In sharp contrast to SEI's platform, Campos' guidelines would establish freedom for research, as well as unrestricted production, domestic marketing and exportation.

Maloof is a partner in the Washington, D.C.-based law firm of Bertiner and Maloney. The story first appeared in Times of America, *a Washington, D.C., newspaper covering Latin America.*

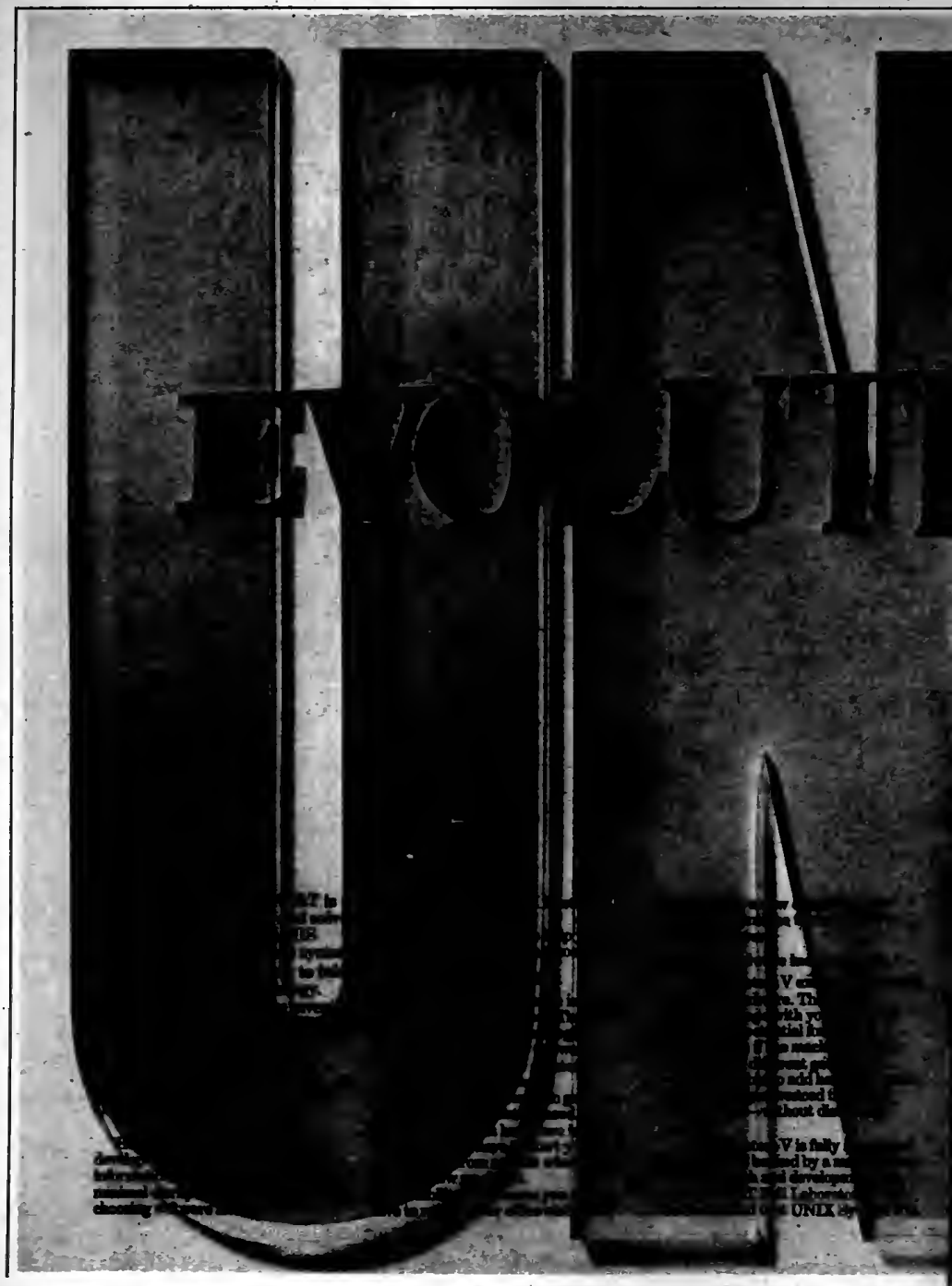
INTERNATIONAL REPORT
CW International News Network

AUSTRALIA

MELBOURNE — In a deal estimated to be worth $12 million, Telecom Australia has reportedly combined 20 millions of instructions per second of usable power in a single system. The newly acquired system, built by NEC Corp. for Honeywell, Inc., is called the DPS 88/92 and reportedly adds 50% more power to Telecom's current network of four Honeywell DPS 8/70s. The 88/92 system will be integrated into the 8/70 network and will offer object-code compatibility, reportedly making Telecom the first end user in the world running Honeywell's Geos 9 operating system. ■

MELBOURNE — The Royal Melbourne Institute of Technology (RMIT) is negotiating a joint research and development arrangement with Control Data Australia Pty. Ltd. here.

To replace its older CDC Cyber 730 mainframe, RMIT recently bought from the vendor a $1.6 million Cyber 180 Model 835 system that runs the NOS/VE operating system. RMIT and CDC are presently discussing joint projects such as further de-



NEWS

velopment of the Plato educational programming language.

■

SYDNEY — Following several months of disagreement with the company's U.S. management over the role of Australia in the Southeast Asian marketplace, the managing director of Prime Computer of Australia Ltd., John Thompson, has submitted his resignation.

Thompson was said to be the only managing director of a Prime subsidiary who reported directly to the vice-president of sales, rather than to a regional manager. He said there had been plans to incorporate Australia in a wider Southeast Asian region, but that he disagreed with the plans, claiming Australia would be "the tail wagging the dog." Though he refused to cite any definite plans, Thompson said he intends to stay in the computer industry.

CHINA

TIANJIN — A 16-bit multiuser microcomputer equipped with Motorola, Inc.'s 68000 microprocessor has just been unveiled here by the Tianjin Computer Research Institute. The system, called the TQ-0671, comes with a 1M-byte internal memory, 64K bytes of read-only memory, 1M byte of external disk memory storage and a 40M-byte Winchester disk drive, the vender said. Other peripherals include a printer, a plotter, two Chinese-character terminals and four standard English-character terminals. The system's Unix-like operating system is said to support Basic, Fortran 77, Pascal, Cobol and C languages. A relational data base management system and a hotel management package are also available, a spokesman said.

■

BEIJING — China's first minicomputer to incorporate bipolar, bit-slice technology has been introduced by the Jiaqhou Electronic Computer Factory. The JZ1163 system, developed in cooperation with Qinhua University, is the newest member of the DJS-1000 minicomputer family, which is said to be China's first and largest minicomputer family. Parallel design has been adopted for the bit-slice CPU, the vender explained, and the instruction cycle is 300 nsec, reportedly the fastest yet in Chinese-made minis. The system incorporates 8-in. double-sided, single-density floppy disk drives; a 10M-byte Winchester disk drive; and 800/1,600 bit/in., double-density tape drives. All software designed for the DJS-1000 family is said to run on the JZ1163.

DENMARK

COPENHAGEN — Financial and insurance companies here have joined forces to ensure fast disaster recovery for their data processing resources. They recently established the Dansk Backup Center, said to be Denmark's first DP contingency facility. The center has launched a contingency planning awareness campaign aimed at DP managers.

NETHERLANDS

AMSTERDAM — The U.S. firm ITT will soon acquire 37% of the Dutch software house Holland Automation International. With 150 employees and revenues of $5.5 million, the Dutch group presently has subsidiaries in France, West Germany, Ireland, the UK and the U.S., making it one of Europe's largest software firms. It plans to use the influx of money from ITT to develop its product line and expand its foreign activities.

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CALENDAR

WEEK OF SEPT. 23

SEPTEMBER 24, NEW YORK — Displaywriter 2. Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

SEPTEMBER 24, NEW YORK — Introduction to Data Communications. Contact: Women in Data Processing, Suite 2008, 310 Madison Ave.; New York, N.Y. 10017.

SEPTEMBER 24, NEW YORK — Introduction to the IBM PC. Contact: Center for Advanced Data Processing, Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

SEPTEMBER 24-25, CHICAGO — The First International Conference on Human Factors in the Work Environment and Computer Ergonomics. Contact: Crispin Littlehales, Thomas L. Richmond, Inc., World Conference on Ergonomics, Suite 1800, 1350 Ave. of the Americas, New York, N.Y. 10019.

SEPTEMBER 24-25, ATLANTA — Integrating Voice and Data in the PBX. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

SEPTEMBER 24-25, WASHINGTON, D.C. — The National Conference on Government Regulation of Offshore Money Flow, Electronic Banking and Currency Reporting. Contact: American University, Office of Continuing Education and Conference, 4400 Massachusetts Ave. N.W., Washington, D.C. 20016.

SEPTEMBER 24-25, NEW YORK — Local-Area Network/PBX Evaluation: A Planning and Decision-Making Perspective. Contact: Data Communications, Special Projects Conference Management Center, 445 W. Main St., Wyckoff, N.J. 07481.

SEPTEMBER 24-25, NEW YORK — Local-Area Networks. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

SEPTEMBER 24-25, WASHINGTON, D.C. — Multitenant Telecommunications Services. Contact: Conference Registrar, Phillips Publishing, Inc., Suite 1200N, 7315 Wisconsin Ave., Bethesda, Md. 20814.

SEPTEMBER 24-25, WASHINGTON, D.C — Digital Networking Technologies, Economics and Opportunities. Contact: Telestrategies, Inc., Suite 102, 6842 Elm St., McLean, Va. 22101.

SEPTEMBER 24-25, WASHINGTON, D.C. — Introduction to Voice. Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

SEPTEMBER 24-25, LOS ANGELES — World Conference on Ergonomics in Computer Systems. Contact: Robert W. Bailey, Computer Psychology, Inc., P.O. Box 16, 54 E. Main St., Mendham, N.J. 07964. Also being held Sept. 25-26 in Dallas, Sept. 26-27 in Chicago and Sept. 27-28 in New York.

SEPTEMBER 24-25, BOSTON — Optimizing Long-Distance Services. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

SEPTEMBER 24-26, WASHINGTON, D.C. — Decision Support Systems on Personal Computers. Contact: Control Data Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

SEPTEMBER 24-26, PHILADELPHIA — Project Management & Control. Contact: Q.E.D. Information Sciences, Inc., P.O. Box 181, 170 Linden St., Wellesley, Mass. 02181.

SEPTEMBER 24-26, LOS ANGELES — Networking Personal Computers. Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110.

SEPTEMBER 24-26, NEW YORK — Data Communications Network Design and Optimization. Contact: Control Data Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

SEPTEMBER 24-26, NEW ORLEANS — The Data Entry Management Association (Dema) "Changes/Choices" Conference and Equipment Exposition. Contact: Dema, P.O. Box 16711, Stamford, Conn. 06905.

SEPTEMBER 24-26, CHICAGO — Microcomputer Software Selection Workshop. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

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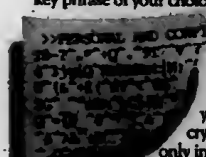

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EDITORIAL

A thorny problem for the court

The U.S. Supreme Court will face a particularly thorny problem in October, when the full bench rules on a matter concerning First Amendment protection of on-line computerized data bases [CW, Aug. 20].

The high court will render a final decision on whether the Vermont Supreme Court acted properly in upholding a $350,000 damage claim against Dun & Bradstreet Corp. This economic information giant, by its own admission, erroneously printed a report of a bankruptcy. The offended party claimed damages; the lower courts and state high court agreed; and the matter was ultimately kicked upstairs to the Supreme Court.

The erroneous information was summarized from one of a growing number of Dun & Bradstreet's computerized data bases, which are available to creditors, among others. Obviously, the concern is not with Dun & Bradstreet or bankruptcy or Vermont due process. The issue is whether a data base vendor has the same privileges and constitutional protection when it makes an honest mistake as the print and broadcast media have when they do.

Consider first the allegedly damaging information that went to Dun & Bradstreet's subscribers. While it is true that many of those subscribers, creditors for example, seek specialized information for specialized purposes, the same type of information — or misinformation — could have been found in the general business or daily press or on radio or television for that matter.

Yet if it could not be shown that these latter information vendors acted maliciously or recklessly, their actions would receive the protection of the First Amendment. Not so with on-line information sellers, the Vermont court ruled, which, according to the plaintiff's attorney, are nonmedia defendants.

Why should it matter how information is dispersed, when the ultimate end (the delivery of information or misinformation) is what is really at issue? The law of the land has to be flexible enough to take into account the dynamic nature of things, especially those affected most directly by technology. We wonder how the state court would have treated the town criers of old — as media or nonmedia defendants.

But there are two sides to every legal battle, and Dun & Bradstreet's is no exception. For example, the plaintiff's attorney charged that the company indeed acted recklessly when it allegedly hired a minor to gather information regarding the bankruptcy in question.

It is high time to reevaluate carefully how information is dispersed in the computer age and also time for information sellers to reexamine their obligations and responsibilities in an era when information is considered both a corporate asset and a weapon.

LETTERS

Residual values evaluated

Roderic L. Eaton's article on lease vs. buy [CW, July 23] assumes a $250,000 computer system will have zero market value after five years. If, however, the system is worth $14,152 or more after five years, then the buy option is more favorable; $14,152 at the end of the fifth year has a present value of $7,036, which offsets the lease advantage.

Residual values need to be evaluated just as carefully as useful lives and financing alternatives when making a decision to lease or buy. Companies that purchase equipment tend to find new uses for old equipment. These new uses would normally not be able to justify the cost of new equipment, but can justify keeping items that are already bought.

Capt. John A. Kolbeck
Kirtland Air Force Base, N.M.

Determining societal direction

Thanks for the editorial, "Social responsibility: The mark of a DP Pro" [CW, July 30]. Too often we forget that we determine the directions of our society not only through politics, but also through the choices we make as professionals and consumers.

Daniel A. Coleman
Chapel Hill, N.C.

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity.

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VIEWPOINT

Good-bye Mr. Kubo

LECHT ON SCIENCE
Charles P. Lecht

These days there are almost 100,000 Japanese businessmen in America sent by their companies in Japan on temporary duty assignments ranging from three to as many as 10 years. Most bring their families with them and settle in a suburban town to take up the lives of ordinary American citizens, commuting daily to nearby cities, usually New York, Los Angeles, San Francisco or Chicago. That many work in high technology — for example, in computer and communications systems — isn't surprising; we learned long ago that in Japan, as in America, these are high priorities in the commercial scheme of things.

Today's essay is about members of one Japanese family who spent over four very successful years in America charming everyone with whom they made contact and who are now going back to their home in Tokyo. It is a success story and one that brings honor to all concerned.

At the end of this month, Kauro Kubo, his wife Michiko and their three children Masako, Yuko and Toru leave their home in Ho Ho Kus, N.J., for the long trek home, their stay in America over. Mr. Kubo was sent here by the mammoth Japanese government-owned Nippon Telegraph and Telephone Co. to aid it in the establishment of a high-technology purchasing office as part of its larger facilities, which had then been in America over 15 years. This, with the help of his colleagues and many Americans, he sucessfully did. That the times of his doing it were fraught with growing high-technology trade tensions between Japan and America should give Mr. Kubo ample reason to be proud. Headlines in American papers during his stay included charges of transgressions by Japanese companies that ranged from copying to stealing, dumping to cornering the marketplace, overbuying to underbuying and just about all the other dirty rotten low-down tricks the competition is likely to play to undermine the good and righteous causes of local folks, say, folks in American movies like *Friendly Persuasion*.

Despite this, Kubo maintained a steadfast faith in the fairness of Americans and their friendship for all people. Not that he wasn't personally hurt when he encountered remarks made about Japan and the Japanese people that were intended to incite racial, religious or nationalistic prejudices to achieve some nefarious end, but he kept his perspective on these, knowing that they were the product of foul human weaknesses in only a few of us, the kind found in all societies, everywhere, including his own in Japan.

I was one of the many fortunate people to meet Mr. Kubo in America; it was shortly after his arrival. His children were in American schools, his wife in control of her modest home in the most American of suburbs and the entire family making American friends by the scores. It was this that caught my eye first, for the family appeared so self-sufficient and happy that I couldn't help but be impressed with the character and strength of the people involved. In my 30 years in our computer industry, I had personally visited many expatriot families from various countries just after they had arrived in the U.S. and were experiencing the usual trauma induced by culture shock. Most succeed in overcoming their urges to leave, but it isn't easy for them to do so. And it doesn't make it any easier when local newspapers carry unabashed sentiment against the visitor's homeland in their headlines and when impolite, ignorant populists call for action against the visitor's country — whatever "action" means. Anyway, never have I witnessed such optimism in any persons like that exhibited by the Kubo family, or a least a desire to make it that carried with it the kind of sensitivity that causes one to handle his problems himself. And if the Kubos are to be complimented, so is the group of Americans that helped the family — only in America is treatment of the stranger so supportive of his particular needs that these are taken care of without "nobody sayin' nothin'," if he shows the slightest inclination to become an asset to the community.

Kubo maintained a steadfast faith in the fairness of Americans and their friendship for all people. Not that he wasn't personally hurt when he encountered remarks made about Japan and the Japanese people . . . but he kept his perspective on these, knowing that they were the product of foul human weaknesses in only a few of us; the kind found in all societies, everywhere.

Almost upon arrival the Kubo family became an asset to the Ho Ho Kus community. Their kids, every bit as active at home in Japan as are any of ours in America, refused to let minor cultural differences — like not being able to speak English — stop them from making friends. A few weeks ago these same kids were watching television, a friend reported to me, when Yuko, 13, was overheard saying that her younger brother, Toru, 10, "humiliates me; you can't take him anywhere." Toru was jumping up and down on a bed as he tried to emulate the Olympic athletes on the TV screen. Echoes of American kids everywhere came from the room as Yuko with her elder sister Masako, 15, tried to subdue Toru.

How American they all had become and how happy they were to be so. They glow as do kids everywhere who have had a happy experience in their own culture and have found joy in another's too.

American kids in Ho Ho Kus should be cited for their fine treatment of the Kubo kids — they exhibited the kind of stuff of which diplomats are made. The Kubo kids will long remember their years in a small New Jersey town that opened its heart to them with feelings of love.

And Mr. and Mrs. Kubo must be cited for the great success they've had in adjusting to and integrating into American life. Their teamwork was remarkable; Mrs. Kubo had spent a year at an American university in 1966, so her command of English and understanding of Americans was invaluable to

See KUBO page 40

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

Spot security checks for a dog day afternoon (or night)

HUMAN CONNECTION
Jack Stone

What with August's dog days upon us, DP staffs everywhere turn their collective thoughts to matters other than job streaming, like sun and fun and picnic delights.

Now, you surely aren't the type of manager to begrudge your loyal minions a little daydreaming, but if you're interested in how to keep them on the track, here is one way: Drop in some unannounced security checks, and they will come alive, believe me.

Too many installations sail along without disruption, blithely taking their security programs for granted, so there's nothing better than a surprise test to uncover some holes in the procedures. I'll wager that you were planning some action in this direction anyway, but have been too busy to start it up.

The notion I'm suggesting here is not a full-scale review of the security system, but rather some quick and dirty checks to set your mind at ease and sharpen up the staff's attention to the procedures.

Here are some ideas to get your security juices flowing:

- Take a look at the personnel files to see if hard-copy forms such as nondisclosure agreements, security clearances and so on are intact, current, complete — and secure.
- If the fire control system has a testing feature, then test it (please, not by lighting a match near a sprinkler sensor). At least check the inspection log of some of the hand extinguishers; you might even turn one on. (Don't forget to send it along for recharging after the experiment.)
- One evening, grab some early shut-eye and show up for the midnight shift about the time the file backup job is running. Validate that the tap dumps are; in fact, created, then logged in to the tape directly and/or sent out of the building for safekeeping.
- Review your disaster recovery plan, particularly to make sure that the resources one which you depending are, in reality, in place. Most important, make certain your backup facility (You do have one, don't you?) is not only in business, but is not so overloaded that it can't handle, as a minimum, your batch jobs in a pinch.

It's also worth a few minutes of your time to scan the disaster procedures documentation to make sure it has some semblance of being current.

And it won't hurt to see if the local power company continues to maintain the capacity to install an alternate power line *tout suite*, just in case.

- Finally, simulate a whiz kid hacker trying to crack the telecommunications access method by dialing up from a remote terminal or personal computer and attempting entry with a fake identification and password.

The next day, sit around the office, impatiently waiting to see if the systems security administrator comes racing in with a suspicious report generated from the security software. (I assume you will mention your intent before the fact to a higher authority so you aren't tagged with a security violation.)

Obviously, this simulation isn't an ironclad guarantee that your installation is 100% secure, but — assuming that no penetration occurred — it should provide some sense of contentment. And if your security controls do leak like a sieve, well, it will sure be nice to know about it before you find your access codes posted on some electronic bulletin board.

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

VIEWPOINT

KUBO from page 39

her husband while the family was settling in. She will long be remembered by a community of American friends as a charming, beautiful person who loves them just the way they are and because they are that way.

On the personal side, Mr. Kubo is a man devoted to golf, his family, his company and God, although one suspects not necessarily in any order. He became a Christian while he was here through study of the life of Christ.

Throughout Mr. Kubo's tenure here, he worked selflessly for his company; I never heard him complain. In doing this while creating an exemplary home life, he provides us with living proof that hard work never hurt anyone: American, Japanese or whatever.

On the professional side, Mr. Kubo is a scientist and a businessman who is by nature a goodwill ambassador for the Japanese government and his company. He has addressed many American groups during his stay; he recently lectured at Harvard on international trade issues. He has had occasion to visit with members of the top echelon of America's computer and communications establishments: AT&T's chairman, Charles Brown, and IBM's chairman, John Opel, included. And his opinions have been listened to by both the American and Japanese governments because of their temperance, intelligence and honesty.

Throughout Mr. Kubo's tenure here, he worked selflessly for his company; I never heard him complain. In doing this while creating an exemplary home life, he provides us with living proof that hard work never hurt anyone: American, Japanese or whatever.

As every Japanese businessman is wont to do, Kubo eschews recognition and always cites the work of his colleagues as instrumental in whatever success he may have achieved. Last January, he successfully renegotiated a Japanese-American trade agreement, which included, among other things, a commitment by his government to purchase more than $140 million in telecommunications and computer products from American companies. He then went shopping, buying a Cray Research, Inc. supercomputer and a lot of other equipment from such recognizable names as AT&T, IBM and Sperry Corp. The *Wall Street Journal* took to quoting Kubo in 1983 and has started to do so again in 1984. He is an expert in international trade.

Like the kids in Ho Ho Kus, American businessmen have every reason to feel some measure of pride in Mr. Kubo's success in this country. They helped Mr. Kubo find love for America, and when he leaves, they can be sure that he'll take it back to Japan. Think about it: With each Kubo we send back to Japan, we send a person full of love and respect for Americans. When these men run tomorrow's Japan, they will be very helpful to us — all of us can always use that.

America will miss the Kubos upon their return to Tokyo. Our national IQ average will drop when they leave our scene, and Japan's will rise. Good-bye Kubos, don't forget us. You are welcome back anytime — hopefully before the kids get too old.

'I'm sorry Mr. Sadler, but human kindness is not a marketable skill.'

SOFTWARE & SERVICES

SOFTLINE
John Gallant
CW Staff

Topics, not size key to trade shows

If you had the opportunity to attend both the recent American Association for Artificial Intelligence National Conference (AAAI-84) on Artificial Intelligence in Austin, Texas, and the National Computer Conference (NCC '84) in Las Vegas, you will likely agree the summer weather in both locales is less than invigorating.

Waiting for a taxi outside the Las Vegas Convention Center or on the street near the gates to the University of Texas at Austin's football stadium, soon left one wilted and parched of mouth.

Never mind the similarities in outside temperature, however. The atmosphere at AAAI-84 was refreshing in the wake of this year's NCC. Though the 3,000 attendees that AAAI-84 garnered made the conference look like a hobbyists' meeting compared with the crowd at NCC, the Las Vegas edition of the computer world's "show of shows" could not compete with the topic-specific AI meeting in terms of generating genuine interest and enthusiasm.

That comment is also applicable to the recent Association for Computing Machinery's (ACM) Special Interest Group on Ada (Sigada) conference (attendance 500) in Hyannis, Mass. Both the Sigada and AAAI-84 meets boasted exhibit areas that could have been wedged into one of the larger booths at NCC. Despite that, the old adage that bigger is not necessarily better was borne out again.

The NCC exhibit area gave off a shopping mall feel, with attendees casually strolling the floor filling glossy vendor-distributed tote bags with buttons and posters. But the technical and marketing representatives of the fledgling AI and Ada market entrants barely had time to shake hands with the eager visitors who

See SHOWS page 50

Debugging less problematic with application generators

By Robert H. Parker
Special to CW3

Application generators are known to offer major time savings in the process of writing code. But they can also dramatically simplify the monotonous task of testing and debugging.

They do this through their modular implementation methodology and the self-correcting, software-driven nature of the debugging process. They also have the flexibility to permit the use of traditional debugging tools when desired.

The modular implementation methodology permits prototype testing during various phases of the development process. The developer interactively specifies each module independently. The modules are then reviewed as prototype versions by the end user. This not only permits thorough testing of the application foundation but also helps identify major ergonomic bugs. For example, Informatics General Corp.'s Mark V on-line application generator can be used to build screen definitions, file definitions, screen control and flow, screen content and validation and application-specific logic independently.

Once this modular, building-block approach is completed, the application is ready for compilation and integration into the production environment. Throughout the development cycle, if a new problem or bug surfaces during the implementation of a new module, the bug is assumed to exist within that module, since all previously specified modules were thoroughly checked through prototyping.

Similarly, if a bug is discovered in a completed application, modules can be removed from the application until the prob-

See DEBUG page 50

Parker is director of product support and administration in the software products group at Informatics General Corp., an application generator vendor.

Tool eases DOS to MVS conversion

SAN FRANCISCO — Rand Information Systems, Inc. has announced Exitdos, a software package designed to ease the conversion of applications running under IBM's DOS to an IBM MVS environment.

According to a spokeswoman, the Exitdos software includes tools that aid in planning, data collection, conversion, testing and implementation. The package converts DOS application programs and the associated JCL statements, files and parameters to an MVS environment.

The spokeswoman said Exitdos includes about 25 programs and documented procedures for converting IBM applications running under DOS to a fully native mode MVS environment. It converts programs, copy books, files, JCL and utility control statements and allows MVS standards to be implemented at the same time. The results of an Exitdos conversion are MVS native mode programs, JCL, files, utilities and MVS standards.

The package is said to offer an integrated approach to converting existing DOS applications to MVS. The transformation process helps achieve the needed changes in programming languages, program structures, computer systems, operating systems and data management, while preserving processing logic.

The spokeswoman said the level of effort required to convert applications code depends on the language. Exitdos reportedly can achieve a high degree of automated conversion of Cobol, PL/I and Basic assembler language programs. Data base systems such as IBM's DL/1 and teleprocessing monitors such as IBM's CICS can also be converted. Exitdos' standards and procedures are said to ensure the accuracy of each conversion step to avoid rework.

Exitdos is priced at $50,000, including one week of support, from Rand Information Systems, 98 Battery St., San Francisco, Calif. 94111.

- XA Systems Corp. has announced a new release of its Data-Xpert productivity package for Cobol programmers using IBM's TSO and ISPF/42
- Computer Associates International, Inc. has announced a new release of its CA-Dynam/CMS file management software/42
- Candle Corp. has extended three of its performance analysis products to run in an IBM IMS 1.3 environment/44
- Control Data Corp. now offers a bank cash management service on its time-sharing network/46

INSIDE

Systems Software/46

Enhanced productivity package unveiled for TSO, ISPF users

SANTA CLARA, Calif. — XA Systems Corp. has announced Release 1.3 of its Data-Xpert programming productivity package for users of IBM's TSO and ISPF.

According to a spokesman, the enhancements to Data-Xpert contained in Release 1.3 include the ability to find and change invalid data in a file based on the Cobol field definition. In addition, the system's extract function has been improved with the capability to extract valid or invalid records from files in either on-line or batch mode.

Data-Xpert is designed for programmers and analysts using TSO, ISPF and Cobol. It uses existing Cobol layouts as templates over data, reportedly eliminating the need to redefine files in other languages. It is said to function without user programming and contains ISPF-like menus and an on-line tutorial with more than 350 panels. The system's interactive features include browsing, editing, printing, extraction and reformatting of records or files of any size, including IBM's Isam, Vsam, partitioned and sequential files.

Release 1.3 of Data-Xpert is licensed at $30,000 and is available from XA Systems, Suite 216, 3000 Scott Blvd., Santa Clara, Calif. 95054.

File system release debuts

JERICHO, N.Y. — Computer Associates International, Inc. (CAI) has announced Release 1.2 of its CA-Dynam/CMS file management software.

According to a CAI spokesman, the CA-Dynam/CMS file management system allows IBM's OS/MVS, DOS/VSE and VM/CMS operating systems to share a common file management catalog. On the basis of preliminary benchmarks, CAI said Release 1.2 features a 70% reduction in the size of the backup catalog and a corresponding performance improvement of 40% during execution, compared with earlier versions.

The spokesman said the enhancements to Release 1.2 also include automatic backup of CMS mode zero files, which were previously considered privately owned by specific users. Also, catalog management routines have been improved to use relative block address techniques and reduce the size of the required catalog records.

Release 1.2 also features extended use of direct-access storage devices (Dasd)and IBM's Dasd Dump Restore program to provide the ability to restore data even when the system is down. Other features include an automatically maintained system history file providing a condensed "resume" of all backup processes, according to CAI. System profile facilities have been extended, with the addition of INCLUDE and EXCLUDE commands for automatic backups. CA-Dynam/CMS is said to provide full support for both the 512-byte CMS disk format and filemode 6 files, two features in Release 3 of IBM's VM/SP.

A three-year lease for CA-Dynam/CMS is priced at $7,000.

More information is available from Computer Associates International, Computer Associates Building, 125 Jericho Tnpk., Jericho, N.Y. 11753.

Software aid out for IBM 3270-PC

CAMBRIDGE, Mass. — Index Technology Corp. has announced a version of its Excelerator integrated software environment for systems analysis, design and implementation for the IBM 3270 Personal Computer.

Excelerator reportedly speeds development and revision of data flow diagrams, structure charts, data model diagrams and other components of systems specification documents.

Systems analysts can utilise the 3270's mainframe communications capacity to transport information to and from the Excelerator-equipped Personal Computer, the company claimed.

Excelerator also offers graphics, data dictionary and word processing capabilities, the vendor said. Users can reportedly design enterprise models, data flow diagrams, data structure charts, record and file layouts, screen definitions and report layouts.

Prices for the Excelerator start at $9,000.

Index is located at 5 Cambridge Center, Cambridge, Mass. 02142.

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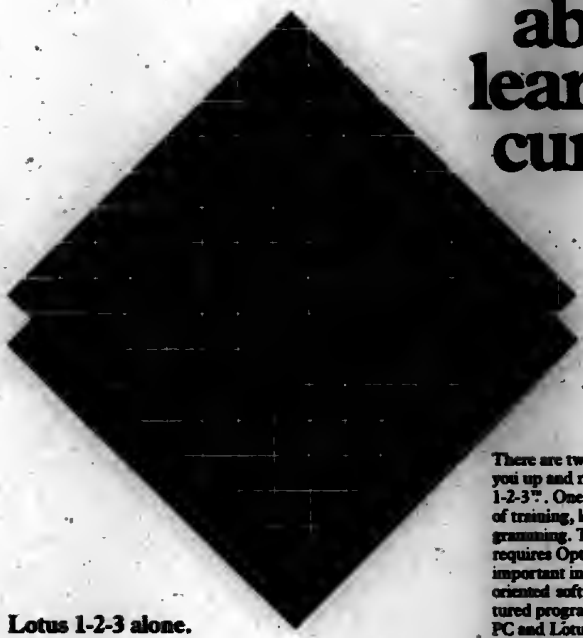

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SOFTWARE & SERVICES

Candle announces support for IBM's IMS Release 1.3

LOS ANGELES — Candle Corp. has announced that three of its products now support Release 1.3 of IBM's IMS. The products include Omegamon/IMS, Dexan/IMS and RTA/IMS. The systems run in both the IBM MVS/SP 1.3 and MVS/SP 2.1 (XA) environments.

Two unique IMS 1.3 features have also been added, a spokesman said. These include prior analysis of tape system logging capabilities that have been converted to show direct-access storage device logging characteristics and message format services analyses that have been refined to support IMS 1.3 design.

The products reportedly fully support the multiple-address space design incorporated in IMS 1.3, and all functions that analyze IBM's DL/1 activities within the IMS Control Region now support the optional relocation of that function to the separate DL/1 address space.

Omegamon/IMS is a real-time performance monitor of IMS activities that is said to improve IMS availability, response time and service levels. Dexan/IMS is also a performance monitor that profiles the degradation of IMS transaction processing to identify performance problem areas. RTA/IMS provides real-time analysis of transaction response times.

The IMS 1.3 versions of these Candle products are scheduled for October release. Omegamon/IMS and Dexan/IMS are priced at $19,500, and RTA/IMS is priced at $9,500.

More information is available from Candle, Suite 2404, 10680 Wilshire Blvd., Los Angeles, Calif. 90024.

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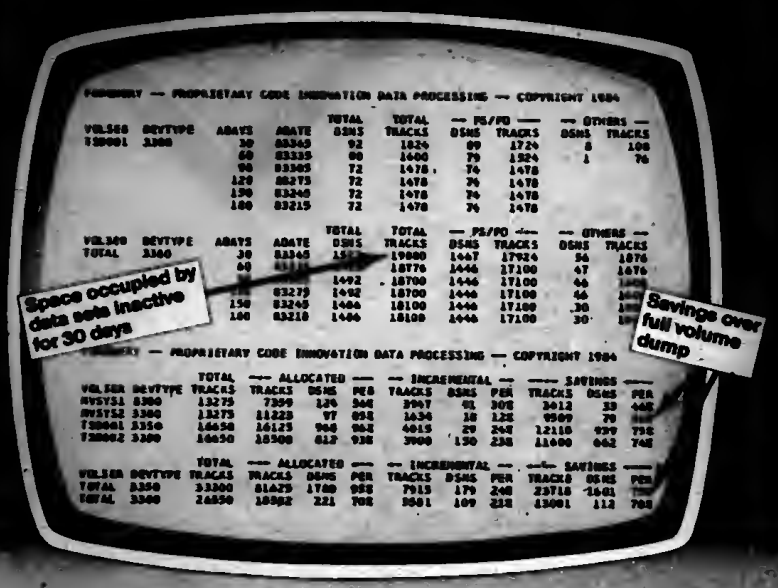

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Intermetrics offers Ada tools for VAX users

CAMBRIDGE, Mass. — Intermetrics, Inc. has announced the Byron/Ada PDL Toolset for users of Digital Equipment Corp.'s VAX-11 processors under VMS and IBM computers under MVS.

According to a spokesman, the Byron/Ada PDL Toolset consists of the company's Byron program development language and five tools designed to support the development of large Ada software systems.

The PDL Analyzer checks a source file for proper Ada syntax and, if no errors are detected, stores an internal representation of the source file in a program library.

The Calltree tool produces a document showing the procedures and functions a given program unit calls and the procedures and functions that call the program unit, the vendor said.

Datadict produces a document showing declarations of types, objects, subprograms, packages, tasks, entries or any combination of those in a selected set of program units and providing a brief description of each.

Deptab produces a report showing the dependencies between program units in the library. The report shows what units will be made obsolete if a given unit is recompiled and the order in which program units should be recompiled.

Userman is used to create a document that describes the external interface to a package or subprogram in the program library, according to the vendor.

The Byron/Ada PDL Toolset is said to standardize the software development process and automate documentation. The DEC VAX/VMS version is priced at $10,000 and the IBM MVS version at $15,000.

Intermetrics is located at 733 Concord Ave., Cambridge, Mass. 02138.

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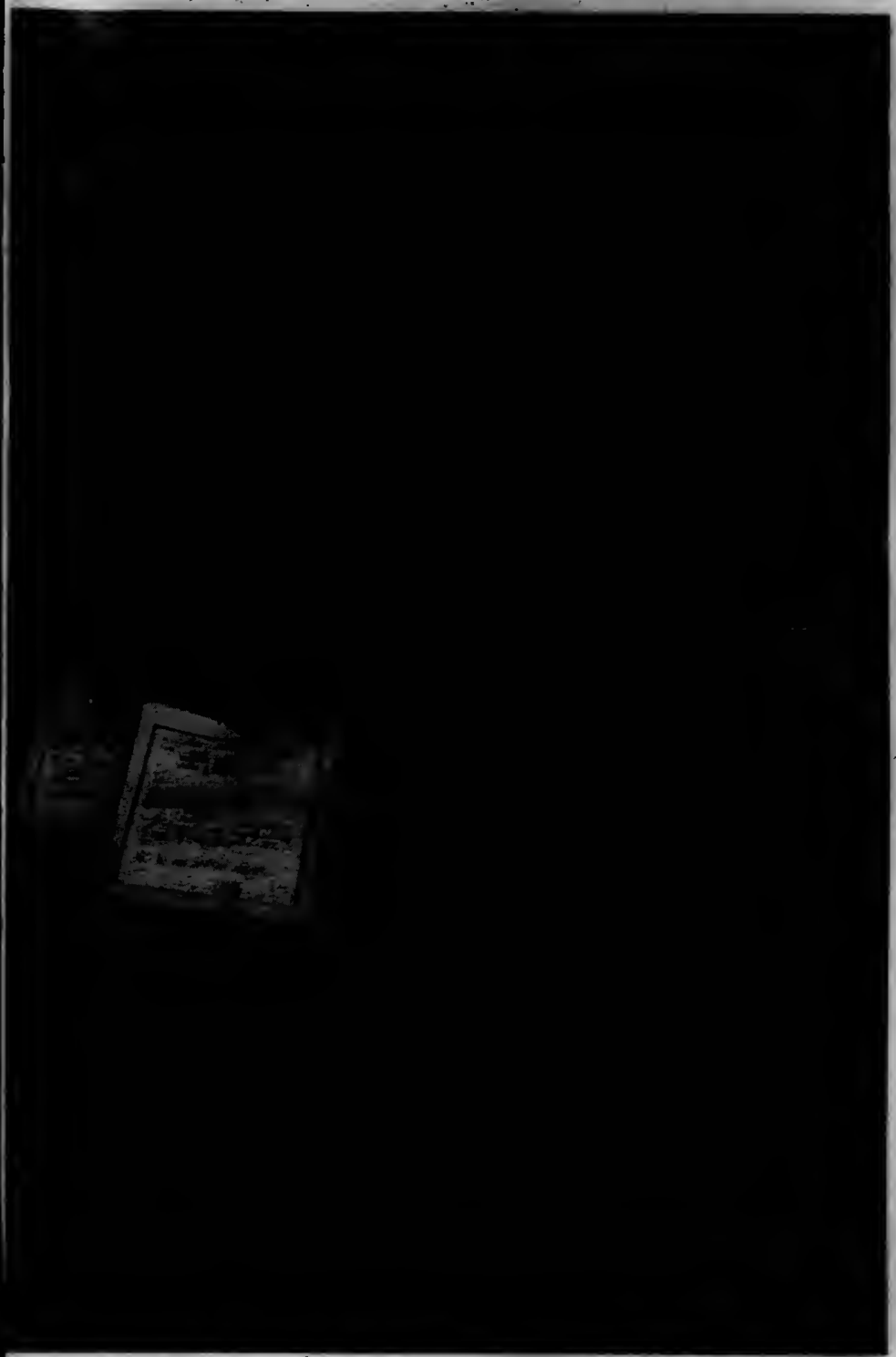

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VM SOFTWARE INC.

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CDC adds banking service to net

GREENWICH, Conn. — Control Data Corp.'s Business Information Services (BIS) has announced the Bank Cash Management (BCM) service on its international remote computer services network.

The BCM service is composed of three modules. The Balance Reporting module provides single- and multibank balance reporting, as well as detailed debit and credit reporting.

The Deposit Reporting module, which offers multiple methods of input including terminal, Touch-Tone telephone, screen and microcomputer, features reports such as daily deposits and transfers, historical deposits and nonreporting locations. The Wire Transfers module provides for both repetitive and free-form wire transfers and encompasses multiple levels of security.

The BCM service can be used on a stand-alone basis or integrated with other BIS services.

It is offered in two modes: through a combination of a user micro and CDC's Call/370 time-sharing service, or through CDC's Distributed Service, which requires on-site user micros and an IBM 4331 or 4361 minicomputer.

Pricing for the BCM service is based on usage. The minimum usage service charge is $200/mo.

Control Data is located at 500 W. Putnam Ave., Greenwich, Conn. 06830.

SYSTEMS SOFTWARE

HOLOS CORP.
CW/Call Whomever

Holos Corp. has released a communications software package for Unix-based systems and any remote device with an Ascii RS-232 transmission capability.

According to the vendor, CW/Call Whomever includes the ability to use any Teletype Corp. unit or Automatic Calling Unit bidirectional port, regardless of ownership or logon status. It also reportedly can use the same port used by AT&T's Call Unix of Unix-to-Unix Communications Program.

The package is said to communicate with any asynchronous Ascii transmission capability and includes a run-in conversational mode so Unix terminals appear to be attached directly to remote devices. This reportedly allows users to transfer files or log entire sessions on remote devices.

It can transfer Ascii files to and from any Ascii device when compiling and running programs on remote systems, and it performs data acquisition and data logging functions from non-Unix devices when set up to run continuously or as a scheduled task, the vendor said.

Ported to the Tektronix, Inc. 8560 and 8561 and the NCR Corp. Tower, the single-purchase price for the multiuser system is $4,200.

Holos, Suite 175, 3772 Pleasantdale Road, Atlanta, Ga. 30340.

LEGIST AUTOMATION, INC.
Remote Document Handler System

Legist Automation, Inc. has announced document handling software for users of Four Phase Systems, Inc.'s Series IV computers.

The Remote Document Handler System (RDHS) provides a mechanism for users at both remote and local locations to create, access, send, delete and otherwise manipulate documents stored in a Four Phase system running Four Phase's Multi-Function Executive system.

RDHS supports user access over standard dial or leased phone lines from any standard Ascii teletype-compatible terminal or terminal emulator program.

The price of RDHS is $3,500 with discounts available for multiple system purchases.

Legist Automation, Suite 6, 2214 Michigan Ave., Arlington, Texas 76013.

RABBIT SOFTWARE CORP.
3270-Plus/Unix

Rabbit Software Corp. has announced the latest version of its 3270-Plus intelligent terminal emulator software, based on the Unix operating system and compatible with IBM's Systems Network Architecture.

The 3270-Plus/Unix system is said to be compatible with all 16- and 32-bit microcomputers running Unix or compatible operating systems.

The software is said to retain all of the local processing power of the microcomputer while providing direct access to, and integration with, IBM 3270 terminal networks.

According to the vendor, use of the product can improve microcomputer-to-mainframe communications and processing response time, increase applications flexibility and provide an evolutionary path to full distributed processing.

Prices are $750 for single-user configuration, between $1,200 and $1,500 for a typical microcomputer cluster of four to six terminals and $5,000 for a typical minicomputer cluster of 50 terminals.

Rabbit Software, One Great Valley Pkwy. E., Malvern, Pa. 19355.

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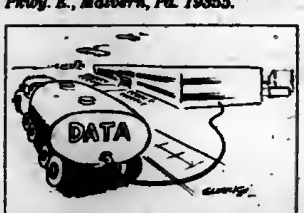

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DEBUG from page 41

lem is located.

Other application generators, such as Oxford Software Corp.'s UFO and Cincom Systems, Inc.'s Mantis, provide test data bases that can be used to prototype the execution of the application.

These various application development approaches allow quick implementation and rapid isolation of program bugs, thus providing the productivity results needed to shorten the implementation process.

Applications implemented in traditional programming languages, such as Cobol and PL/I, are debugged using trace facilities and diagnostic dumps. That is, the debugging process is dump-driven.

Program bugs such as data checks, buffer overflows and I/O errors cause abnormal termination and dumps. The application programmer must be capable of understanding internal operating systems and data bases/data communications and must be well-versed in reading dumps and diagnosing complex problems.

Application generators feature software-driven debugging. Automatic features exist to trap data exceptions, erroneous data base status codes and other common program bugs. A diagnostic message is issued that pinpoints the error. In some cases, applications are even self-correcting.

A problem that exists in the traditional Cobol, PL/I approach is in the area of program structure. In many instances, structured programming standards do not exist or are not enforced. This results in unwieldy applications that normally require program traces to unravel the extremely difficult debugging and maintenance problem.

A standard structure is characteristic of application generators. All applications have similar architectures and specific modules perform the same specific function in each application. The standard structure can be assumed each time a programmer is given the task of discovering a program bug or maintaining an existing application. This simplifies the debugging/enhancement process and reduces incidences of further errors.

The productivity gains provided by application generators are significant in all areas of the application development life cycle, including the testing and debugging phases. In the future, the evolution of these products and the implementation approaches they provide may completely eliminate the traditional debugging process.

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SHOWS from page 41

crowded their tiny booths. The attendees waited patiently for their opportunity to pose in-depth questions that demanded more than rehearsed marketing pitches in return.

Salesmanship took a back seat to the real exchange of ideas that characterized both AAAI-84 and Sigada. And, for those seeking information about these budding technologies and looking for insights into new areas of research, it was refreshing to talk to representatives who were willing to divorce themselves from their own corporate strategies and product offerings and talk about the future of AI and Ada technologies.

That is the kind of information that can really help users make decisions for the future. It also generates a good deal of interest in these emerging technologies, which can only be a boon to their growing markets. It may also be one explanation for why attendance at AI and Ada conferences is growing, while the crowds appear to be dwindling at NCC.

This is not intended to single out NCC for criticism. Many of the major trade shows are exhibiting the trend toward more gloss than substance. One can only wish that trend will not expand.

A good case in point is Unix. The Uniforum conference on Unix held in Washington, D.C., in January exhibited the same fertile atmosphere of discussion as AAAI-84 and Sigada. But will that hold true for the numerous Unix shows already planned for the coming months? Let's hope so, because a conference atmosphere can indeed be refreshing despite the temperature outside.

COMMUNICATIONS

Telentry ties incompatible WP units, micros

STAMFORD, Conn. — Telentry Systems, Inc. has introduced a network service said to enable information to be exchanged between otherwise incompatible word processors and personal computers.

The Telentry service requires the installation of a Datadriver at each of the subscriber's sites. These provide service access for up to 16 communicating word processors or personal computers.

These Datadrivers use a proprietary translation algorithm to encrypt and compress documents before forwarding them through the public telephone system to remote Datadrivers. That device translates the document for the recipient word processor or computer, the vendor said.

The Datadriver, which can reportedly store multiple documents up to 1,000 pages in length, notifies the subscriber of the presence and priority of documents and protects against loss of documents by use of nonvolatile memory. Document security is provided via encryption and address verification.

The service is available for both intracompany and intercompany use and is targeted at document-intensive sectors such as insurance, banking, securities, law and advertising.

Prices are based upon the priority desired, with 30-min delivery costing $1 per page, four-hour delivery costing 50 cents per page and overnight delivery costing 30 cents per page.

The service will be available on a limited basis in October, with full-scale nationwide service beginning in January, according to the vendor.

Additional information is available from Telentry Systems, which is located at 2777 Summer St., Stamford, Conn. 06905.

INSIDE

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Broadband cabling in PC Network raises questions

DATA STREAM
John Dix
CW Senior Editor

IBM's recently introduced PC Network fills an obvious need, but raises questions about the firm's intentions for the product.

The most unusual part of the announcement revolves around the use of broadband coaxial cable technology. Why employ CATV-type technology for distance-limited personal computer networks after endorsing the use of balanced twisted-pair wiring — cheaper and easier to work with — for premisewide corporate networking?

There are at least two possible answers. By demonstrating the ability to support simultaneous video transmissions at the network's introduction, IBM may be hinting at future video applications, perhaps involving optical disks. But it is more likely that the price for broadband was similar enough to baseband systems to make it an attractive alternative with which IBM could hedge its bets against as-yet-unknown user requirements.

As announced, the most unique thing about the PC Network is the claim that it provides attached personal computers with a session-level interface that is said to be equivalent to the fifth level of the International Standards Organization's Open Systems Interconnection network architecture.

This control is housed in the PC Network Adapter, a circuit card that fits into IBM Personal Computers, Portable Personal Computers, Personal Computer XTs and the newly announced Personal Computer AT. These roughly $700 interface cards also house the carrier-sense multiple access with collision detection access protocol and a board-level radio frequency modem.

Other components of this branching tree, 2M bit/sec network include: the Network Translator Unit; the Network Base Expander; and extension/expansion kits.

The $600 translator is the equivalent of a headend in CATV systems and CATV-type local-area networks. All transmissions are routed through the translator. By itself, the translator can support eight personal computers. To support more personal computers, a Base Expander unit must be added to a ninth translator port.

The Base Expander also has eight ports. Each of these can support a personal computer or, alternatively, what IBM calls the short-, medium- and long-distance expansion kits. The distance kits provide support for personal computers located more than 200 feet from the translator. Each kit, regardless of the distances supported, provides remote support for eight additional computers.

A maximally configured PC Network can support 72 personal computers: eight directly attached to the translator and 64 attached to the base expander (each port

See PCNET page 53

North Ridge offers beefed-up version of Vtam facility

REDMOND, Wash. — North Ridge Software, Inc. has announced its Network Director Version 1.2, the general release version of its Vtam-based network management facility.

It reportedly is a network monitor, network management aid, Vtam application management tool and a network security facility.

According to the vendor, Network Director presents the user with an application selection menu that allows the operator to see the current status of all the installation application subsystems the user is authorized to access. It reportedly employs the concept of a logical network, a set of terminals or users and Vtam application subsystems, to manage Vtam networks.

The package runs IBM systems under MVS with IBM ACF/Vtam.

Network Director Version 1.2 costs $15,000 for a perpetual object license and $12,500 for a perpetual source license, the vendor said.

North Ridge Software is at 26109 N.E. 24th St., Redmond, Wash. 98053.

Canoga unwraps multiplexer for 3274 controller

CANOGA PARK, Calif. — Canoga Data Systems, Inc. has introduced a multiplexer for the IBM 3274 terminal controller. The CDX-327 Eliminator multiplexes up to 32 coaxial cables into one coaxial or fiber-optic cable. Remote terminals hanging off another Eliminator can be up to a mile away.

One stand-alone unit reportedly supports eight terminals on a single cable. A modular, rack-mounted unit can be configured to support eight, 16, 24 or 32 monitors and printers. The multiplexers are said to be transparent to IBM Category A devices and other compatibles.

The Eliminator can be configured in point-to-point, multidrop or star topologies, the company said. All units have status and fault indicators for each channel. Multiplexers can be field-upgraded from a coaxial cable medium to fiber optics.

The cost of the multiplexer is $1,100 for an eight-channel, stand-alone unit with coaxial cable.

More information is available from Canoga Data Systems, which is located at 21218 Vanowen St., Canoga Park, Calif. 91303.

Enhancements out for Barrier security device

ORANGE, Calif. — International Anasazi, Inc. has announced enhancements to The Barrier, a password protection device designed to limit access on dial-up lines.

Said to be compatible with all computer systems, including personal computers, The Barrier is installed between the computer and modem with no additional hardware or software needed, according to the vendor.

Improvements reportedly include menu-driven operation and compatibility with 2,400 bit/sec modems as well as the earlier compatibility with 300/1,200 bit/sec modems.

Other enhancements are said to include the ability for transmissions to originate from either a remote device or a host port and the ability to drop the telephone line after the user enters three invalid passwords.

The Barrier costs $369, according to the vendor.

Additional information can be obtained from International Anasazi, which is based at 2914 E. Katella Ave., Orange, Calif. 92667.

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August 10, 1984

COMMUNICATIONS

VOICE/DATA COMMUNICATIONS

FIBRONICS INTERNATIONAL, INC.
FOV 4000; FM 901; FM 1601; FOV 832

Fibronics International, Inc. has introduced several products for use between monochrome and color graphics terminals and computer-aided design systems.

The systems include the FOV 4000 series of fiber-optic cable; the FM 901 Unibus slot extender, which interfaces with Digital Equipment Corp. VAX-11 and PDP-11 minicomputers and other Unibus products; the FM 1601 single-channel modem; and the FOV 832, a channel card for the Fibronics 128 channel multiplexer.

The FOV 4000 series costs from $6,000 to $30,000. The FM 901 slot extender is priced at approximately $10,000; the FM 1601 at $1,100; and the FOV 832 at $6,000.

Fibronics International, 335 Stevens St., Hyannis, Mass. 02601.

OPTELECOM, INC.
Fiber-optic links for Apollo Domain

Optelecom, Inc. has announced fiber-optic links for use in Apollo Computer, Inc. Domain networks.

The optical fibers are said to replace the coaxial cables used in Domain and extend the range for remote workstation support up to 3 km without degrading system performance.

Domain's network is said to use a token-ring passing structure, which allows any subscriber to send information by putting data in an available time slot on the ring.

The fiber-optic interface is available as a stand-alone module called Optelecom Model 4220 or as a circuit card called Model 6080 DOM that plugs into the Optelecom Model 5000B card chassis.

Both interfaces are available now. The price is $700 for the Model 4220 and $650 for the Model 6080 DOM.

Optelecom, 15940 Luanne Drive, Gaithersburg, Md. 20877.

PROTOCOL CONVERTORS

INNOVATIVE ELECTRONICS, INC.
MC 80/700

Innovative Electronics, Inc. has announced a protocol conversion unit that is said to enable the use of low-cost printers and other hard-copy output devices in the IBM 3270 environment.

The MC 80/700 emulates the IBM 3287 printer, enabling the use of dot matrix or letter-quality printers and high-performance line printers that are said to be less expensive than IBM products.

The MC 80/700, self-contained and user-installable, has a Type A coaxial connection for use with the IBM 3274 or 3276 cluster controller, requiring no modifications to either the printer or controller, according to the vendor. It reportedly is compatible with all IBM environments.

It is priced at $1,495.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

SOFTWARE

MOLECULAR COMPUTER, INC.
Cleo-3270; Cleo-3780

Molecular Computer, Inc. introduced two emulation software packages that are said to make all of its multiuser business systems compatible with IBM mainframes. These products run under Molecular's N/Star operating system.

Cleo-3270 emulates an IBM 3276/2 controller and supports up to eight 3278 interactive display terminals or 3287 printers. Cleo-3780 emulates an IBM 3780 Remote Batch Workstation for transmission and reception of data files over ordinary phone lines.

The software packages are available on 8-in. single-density diskettes or 5¼-in. double-sided, double-density diskettes. Cleo-3270 is priced at

$995 and Cleo-3780 costs $495. The application processor board is priced at $995.

Molecular Computer, 251 River Oaks Pkwy., San Jose, Calif. 95134.

COMMUNICATIONS RESEARCH GROUP, INC.
Blast

Communications Research Group has announced that its Blast communications software package is now available for Digital Equipment Corp. PDP-11 minicomputers running under DEC's RSX.

PDP-11s running Blast are said to enable binary data files, text files or commands to be transferred between any of 70 other computers running Blast. It costs $695.

Communications Research Group, 5929 Jefferson Highway, Baton Rouge, La. 70809.

MULTIPLEXERS/ MODEMS

INTERNATIONAL DATA SCIENCES, INC.
Model LS56K, LVS76.8 modems

International Data Sciences, Inc. announced two new limited-distance modems.

The Model LS56K is designed for use with the CCITT V.35 interface and is capable of transmission speeds up to 56K bit/sec and distances up to three miles, according to the vendor.

It can work in point-to-point, polled multidrop, half-duplex two-wire and full-duplex four-wire operating modes, the vendor said.

The Model LVS76.8 modem has the same features as the LS56K V.35 modem with transmission speeds up to 76.8K bit/sec and distances of up to 11 miles. It is designed for use with the RS-232C interface and conforms to Bell Laboratories' 43401 specifications.

The price of both models is $650.

International Data Sciences, 7 Wellington Road, Lincoln, R.I. 02865.

TRANSEND CORP.
Model IPI-1200; IPX-1200

Transend Corp. has announced its Infophone line of modems, available as a plug-in card for IBM Personal Computers or as an external stand-alone device.

The plug-in Model IPI-1200 and Model IPX-1200 stand-alone modems can reportedly be used with any computer with an RS-232 interface.

The full-duplex modems operate at 300 or 1,200 bit/sec and feature auto-dial, autoanswer operation with automatic voice/data switching, pulse and Touch-Tone operation.

Now available, the Infophone IPI-1200 internal modem costs $370. The IPX-1200 costs $445 when purchased with Transend software.

Transend, 2190 Paragon Drive, San Jose, Calif. 95131.

ANDERSON JACOBSON, INC.
AJ 9601-LD

Anderson Jacobson, Inc., has announced a leased-line modem that can back itself up by establishing two dial-up circuits whenever the leased-line modem loses the carrier or the data quality of the line drops.

The AJ 9601-LD is a 9,600 bit/sec modem that operates over a four-wire dedicated circuit in point-to-point data communications. It is said to be a full-duplex, synchronous modem compatible with CCITT V.29.

The modem eliminates the need for manually dialing the backup circuits in case of failure and the need for two telephone sets. Deliveries are scheduled for the fall.

The modem costs $2,545.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131.

LOCAL-AREA NETWORKS

CR COMPUTER SYSTEMS, INC.
X-Net

CR Computer Systems, Inc. has introduced X-Net, a local-area network that reportedly enables IBM 3278/3279, Digital Equipment Corp. VT100 terminals and IBM Personal Computers to communicate with IBM, DEC and Hewlett-Packard Co. host computers on one cable.

X-Net reportedly provides protocol conversion, screen format mapping, frame routing and flow control. Users reportedly need to learn four keyboard commands to use X-Net, and up to eight layers of password protection can be implemented.

X-Net, a dual-bus net with rooted-tree topology, reportedly allows up to 2,032 connections per site. Its controller uses a roll-call polling system to command data transport. Data collisions are said to be eliminated.

X-Net costs $1,000 per connection.

CR Computer Systems, Suite 182, 5456 McConnell Ave., Los Angeles, Calif. 90066.

PCNET from page 51

on the base expander supporting pods of eight additional personal computers).

IBM said the net can be increased to provide peer-to-peer support for up to 1,000 personal computers.

Supporting peer-to-peer communications is relatively easy on a network where all devices are peers. When integrating personal computers into a premise-wide Cabling System, however, peer-to-peer communications becomes a horse of a different color. While IBM has made it clear that it intends to address peer-to-peer communications between unequal devices through additions to its Systems Network Architecture, it is unclear when IBM will make this feature available for products such as the PC Network.

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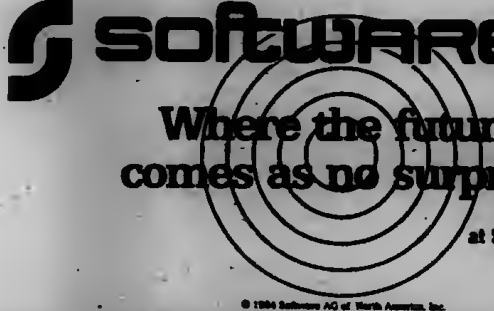

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SYSTEMS & PERIPHERALS

HARD TALK
Tom Henkel
CW Senior Editor

Processor ratings don't measure up

There are no simple answers when it comes to measuring processor performance. While many people would like a handy way to tell instantly if one system is better than another, a reliable rating system has not been, and may never be, developed.

A case in point is that of millions of instructions per second (Mips), which has become a widely used standard of measurement for processor performance. Virtually everyone seriously involved with measuring processor performance will declare that Mips is a meaningless measure.

For one thing, there is no clear definition of exactly what Mips is. In broad terms, Mips refers to the number of instructions a CPU can execute in a second. But speaking in broad terms is much easier than performing the pinpoint calculations necessary to produce a Mips number. For example, what is an instruction? How many different types of instructions were used when the Mips figure was calculated? What type of job mix was running at the time Mips was being calculated? How many people were using the system? And what kind of work were they doing?

Joseph A. Lukes, research and development manager with Hewlett-Packard Co.'s Information Networks Division recently suggested that computer makers should kill Mips once and for all by developing a more meaningful standard benchmark. The idea certainly has merit, but the chances of it ever happening are slim.

For one thing, it is not clear that there is any single way of rating multiple vendors' computer systems. Systems employ different instruction sets and different operating systems. Furthermore, some systems use cache memory; others do not. Some have floating-point processors to crank out calculations at high speed. Other systems were designed for data base applications. It is hard to believe that a rating system could be developed that would fairly take into account all

See MIPS page 60

NCR introduces line of desktop workstations

DAYTON, Ohio — NCR Corp. recently unveiled a line of desktop office workstations, the Worksaver 300 series, and related peripherals, which the firm said it plans to market as an office automation system to large corporations and federal institutions.

Said to be compatible with existing Worksaver 100 and 200 series products, the Worksaver 300 reportedly integrates office information processing functions by offering local word processing and business management software, such as Microsoft Corp.'s Multiplan spreadsheet package and NCR's Wordready word processing software, and offers the ability to interface with mainframe processors via IBM 3270 terminal and NCR terminal emulation modes. The unit is also said to offer support for IBM's Systems Network Architecture/Synchronous Data Link Control and for Ethernet networks.

The Worksaver 300 workstations, which are manufactured for NCR by Convergent Technologies, Inc., incorporate an Intel Corp. 80186 microprocessor and feature from 256K to 1M bytes of random-access memory (RAM). The unit comes with a 12-in. CRT terminal with a 29-line by 80-

See NCR page 60

Computervision offers CAD/CAM support system

BEDFORD, Mass. — Computervision Corp. has introduced a multiuser, multiapplication system that is said to be designed for computer-aided design and manufacturing (CAD/CAM) systems.

According to a spokesman for the company, the Designer V-X Series M incorporates the company's CGP 200X graphics processor and features 50% faster throughput than the Designer M Series 40 that it replaces.

The Series M supports four additional 300M-byte disk drives along with the standard 300M-byte disk drive included in the system.

It also supports Computervision's Cadds 4X software and can support up to three interactive users at the same time, the firm said.

Designer V-X Series M is available in several configurations.

The list price for a basic system is approximately $250,000, including a CGP 200X processor, Cadds 4X software, one 300M-byte disk, a tape drive, two Computervision Instaview color graphics terminals and an application package, according to the vendor.

Computervision is located at 100 Crosby Drive, Bedford, Mass. 01730.

■ Burroughs Corp. announced the S4000 series of document processing systems/86

■ Control Data Corp. unveiled a nonimpact printer for its Cyber 170 and 180 series mainframes/86

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Burroughs unveils S4000 series document processing systems

DETROIT — Burroughs Corp. has introduced the S4000 series of document processing systems and four application software packages to accompany the series.

The S4000 includes an operator-adjustable keyboard, 400 document/min track speed, an 800-char. system display, a built-in 10M-byte fixed disk drive, 512K bytes of random-access memory, a 1M-byte removable media disk drive, four to 36 sort pockets, data communications capabilities and a programmable dual-line matrix endorser that offers 40 char./line.

The line reportedly uses image-lift technology and a character display screen to help correct unreadable characters, the company said. Standard in the S4300 and S4600 are the Advanced Magnetic Ink Character Recognition single-station dual readers. S4900 series models may be ordered with optional single or dual optical character recognition (OCR) readers.

According to the company, the dual-station multifont OCR reader scan lines may be read on two different levels on the same document or two different documents.

Application software packages for the system are Proof of Deposit, Fine Sort/Bulk Filing, Remittance Processing and Data Send and Receive.

Prices for the S4000 models start at approximately $45,000. Burroughs will begin customer shipments of the S4900 in the third quarter of this year. Shipments of the S4300 and S4600 models will be available in the fourth quarter.

Additional information is available from Burroughs, which is located at Burroughs Place, Detroit, Mich. 48232.

CDC releases print facility for CPUs

Control Data Corp. has announced an electronic printing facility for use with its Cyber 170 and 180 mainframes.

The 5870 Non-Impact Printer is said to combine computer, xerographic and laser technologies to produce text and graphics. Major features are said to include dozens of type sizes and styles; printing speeds up to 70 page/min; a capability to handle paper weights ranging from 16-lb bond to 110-lb index-cut paper, including predrilled and preperforated; conversion between horizontal and vertical printing of characters; production of almost any image from a digital source; printing on one or both sides of paper; and clear registration of variable data.

Software support for the printer is under the CDC Network Operating System.

Scheduled for delivery in first-quarter 1985, the 5870 Non-Impact Printer is priced at $236,500. Graphics capability costs an additional $20,900 and includes 2M bytes of memory.

CDC is located at 8100 34th Ave. S., Minneapolis, Minn. 55440.

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SYSTEMS & PERIPHERALS

TURNKEY SYSTEMS

CIE SYSTEMS, INC.
Medical Solutions Package

CIE Systems, Inc. (Cies) has introduced a medical practice management computer system for multiphysician and primary care facilities.

The Medical Solutions Package comes with Cies Med/680 software, which reportedly permits patient information updates and links treatment and procedural information to an accounts receivable and third-party billing system.

Using the Cies 680/20 supermicrocomputer, the Medical Solutions Package can accommodate up to four users. It is said to come with an integrated CRT terminal and keyboard, 256K bytes of Winchester disk storage (expandable to 20M bytes) and 500K bytes of floppy disk capacity for data backup.

The Medical Solutions Package costs $10,350.

CIE Systems, P.O. Box 16579, 2515 McCabe Way, Irvine, Calif. 92713.

PROCESSORS

AUTOSCRIPT, INC.
Argonaut I

Autoscript, Inc. has introduced Argonaut I, a Digital Equipment Corp PDP-11/23-based system with a processor board for Digital Research, Inc.'s CP/M operating system.

Argonaut 1 reportedly offers 40M bytes of disk storage and five ports and permits users to choose either DEC or Digital Research operating systems.

Its CP/M processor board reportedly permits the creation of CP/M virtual disk files on DEC disks while copying between CP/M formatted files and the virtual disk files of the PDP-11. Diagnostics for the modules of the CP/M processor are said to be included.

Argonaut I is priced at $13,855.

Autoscript, 11 Mountain Ave., Bloomfield, Conn. 06002.

DATA STORAGE

GOULD, INC.
584L memory expansion

Gould, Inc. has announced the availability of expanded memory, up to 128K bytes, for its 584L programmable controller.

Optional memory capacities in excess of 32K bytes are available in increments of 48K, 64K, 96K and 128K bytes for the 584L, the vendor said.

Increased memory capacity provides mass storage for data stored in binary coded decimal, 16-bit binary, hexadecimal and Ascii formats. The data is stored in files made up of storage registers. A 584L controller can now have up to 10 files, each with 10,000 registers, the vendor said.

All expanded memory sizes are said to be compatible with the 584L controller. The price for 128K bytes of memory is $29,000.

Gould, P.O. Box 3083, Andover, Mass. 01810.

GRECO SYSTEMS
FDS-200, FDS-800 Minifile

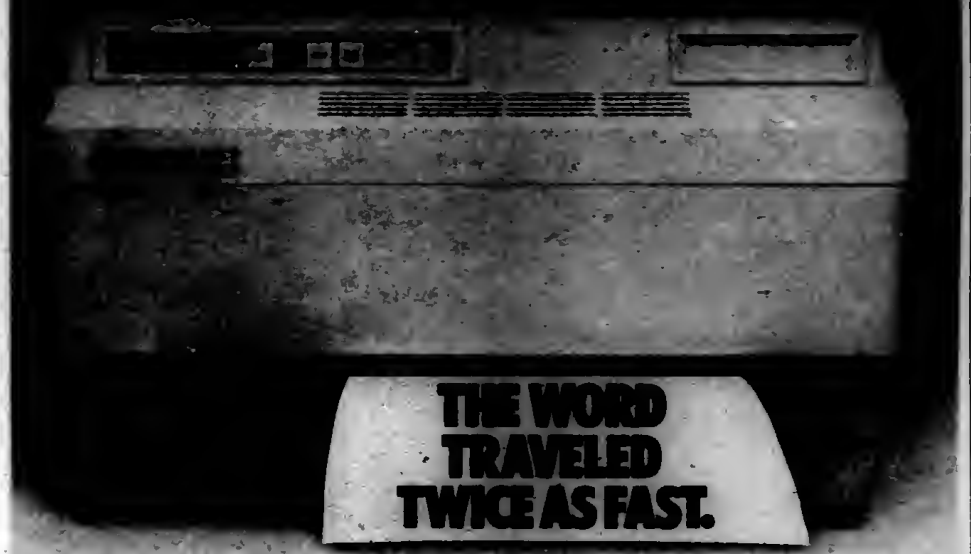
Greco Systems has introduced its FDS-200 and FDS-800 Minifile intelligent mass storage systems for use in replacement of punched paper-tape devices.

The Minifile is said to be a self-contained, portable unit containing disk drives, a power supply, a microprocessor, serial and parallel interfaces and a small key pad and display. It reportedly offers storage of up to 6,600 ft of tape data on a diskette. It is also said to offer some system and file management functions.

The Minifile is offered in a

Continued on page 86

WHEN HEWLETT-PACKARD USED LASER TECHNOLOGY TO BRING YOUR PERSONAL COMPUTER A LETTER QUALITY PRINTER THAT OPERATES AT UP TO 300 CHARACTERS PER SECOND,



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SYSTEMS & PERIPHERALS

Continued from page 57

version using 8¼-in. diskettes, the FDS-800; and a version using 5¼-in. diskettes, the FDS-200. The FDS-800 is priced at $3,500. The FDS-200 is priced at $2,195.

Greco Systems, 372 Coogan Way, El Cajon, Calif. 92020.

TERMINALS

BRAEGEN CORP.
C3 keyboard

Braegen Corp. has introduced a detachable keyboard that is said to be functionally equivalent to IBM's C3 3278 keyboard.

The C3 keyboard is said to feature single-stroke functions that enable users to clear the screen, delete lines and perform other similar functions that previously required two keystrokes.

The keyboard connects to the vendor's Elan controller and terminal products, which support up to 120 IBM 3270-type devices over an RG62 coaxial local-area network. With Elan devices, the C3 keyboard can support session/application and multiple address-switching functions, the vendor said.

The keyboard will be available in the third quarter of the year, the vendor said. Current users of the vendor's 8520 series display stations can upgrade the keyboard for a normal installation charge.

The cost of the keyboard is included in the purchase price of approximately $60,000 for the Elan local-area network with one 8500 control-

Continued on page 88

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FALCON's on-line instructions help you design screen formats, enter and verify data, maintain files, create tables, and submit your own jobs. Just touch a key, tell FALCON what you want to do, and the instructions appear right on the screen.

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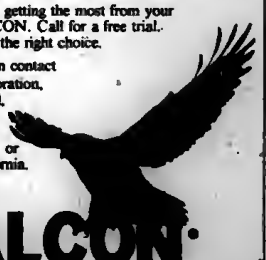

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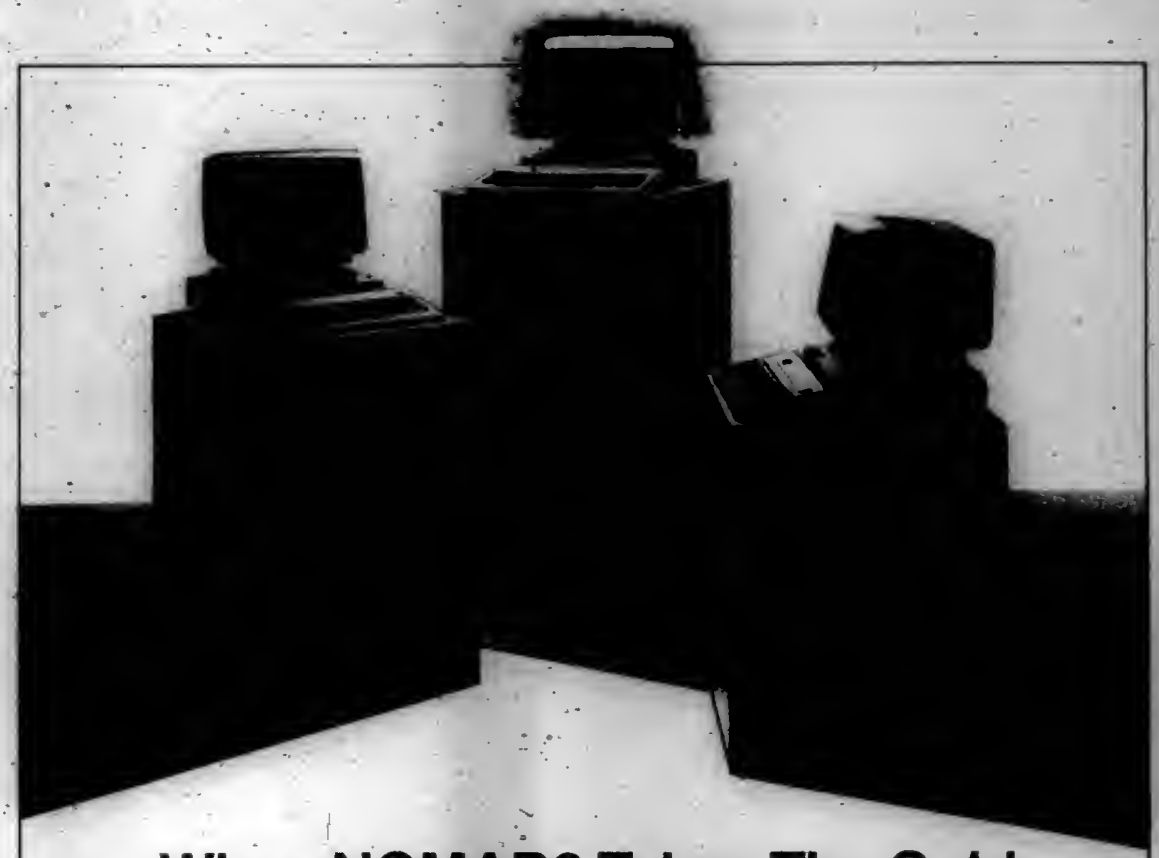

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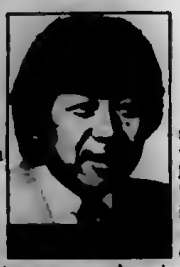

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SYSTEMS & PERIPHERALS

Continued from page 58

ler, 20 8520 displays and one 200/50 char./sec printer.

Braegen, 525 Los Coches St., Milpitas, Calif. 95035.

VERSATEC, INC.
450 series

Versatec, Inc., a Xerox Corp. subsidiary, has announced its 450 line of graphics network processors for color and monochrome remote electrostatic plotting.

The Versatec 451 is said to emulate an IBM 3777 remote job entry station, sending and receiving Ebcdic or binary data on a Systems Network Architecture network using the Synchronous Data Link Control protocol.

The Versatec 452 reportedly emulates an IBM 360-20 Hasp workstation, and the Versatec 454 handles asynchronous transmissions.

The 451 and 452 each cost $8,500, and the 454 costs $5,000.

Versatec, 2710 Walsh Ave., Santa Clara, Calif. 95051.

PRINTERS/PLOTTERS

SCIENCE MANAGEMENT CORP. SEICOM
Seiko 8630

Science Management Corp. (SMC) Seicom has announced a printer for its Seiko Series 8600 multiuser business computer.

The Seiko 8630 is a dual-mode printer featuring both correspondence-quality and draft-speed printing, the vendor said. With standard RS-232C and parallel interfaces, it is compatible with the Series 8600 and other leading microcomputers, according to the vendor.

It is said to feature a print speed of 417 char./sec in draft mode, 14 type fonts, boldface and enlarged printing and three graphics print densities.

The 8630 costs approximately $1,525, the vendor said.

SMC Seicom, 1011 Rt. 22, Bridgewater, N.J. 08807.

AT&T INFORMATION SYSTEMS
Model 5310; Model 5320

AT&T Information Systems has announced two additions to its teleprinter line, the Model 5310 and the Model 5320.

The teleprinters can operate at line speeds from 110 to 9,600 bit/sec, in asynchronous or isochronous modes, using an Ascii or Ansi 3.64 format.

Both dot matrix teleprinters feature printing at 200 char./sec in a straight burst mode, with an average print speed of about 150 char./sec., according to the spokesman for the vendor.

The Model 5310 weighs 16 lb and is portable. It costs $1,295. A detachable keyboard is available for $200, and a built-in modem costs $500, the vendor said.

The Model 5320 offers a wider paper-handling mechanism for applications requiring spreadsheet-type output. It costs $1,795, according to the vendor.

AT&T Information Systems, 100 Southgate Pkwy., Morristown, N.J. 07960.

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char. display. A 15-in. monitor is optionally available, the vendor said.

One double-sided, dual-density 5¼-in. diskette drive is included, with a capacity of approximately 630K bytes. A 10M-byte hard disk drive is also available. Three hard disk units can be attached directly to the Worksaver 300, and the vendor said that by adding a disk control unit to each directly attached disk drive, users can incorporate up to nine hard disks.

NCR is offering a choice of three letter-quality printers with the Worksaver 300 that can operate at speeds ranging from 20 to 55 char./sec. In addition, the printers can incorporate several paper-handling devices, including single- and dual-sheet feeders, bidirectional forms tractors, cut-sheet guides and envelope attachments. The three printers cost $2,000, $3,000 and $3,875 in 20, 35 and 50 char./sec capacities. In addition, two dot matrix printers, in 80- and 136-col. formats, are available for $830 and $1,185 respectively.

The Worksaver 300 can be used as a professional workstation, a cluster station, a stand-alone office automation workstation or a master office automation workstation controlling up to four cluster stations. The vendor said that capacity will be expanded to seven cluster stations within 30 days, when the firm reportedly will announce a 40M-byte Winchester disk drive for the system.

The Worksaver 300 is available immediately. A typical configuration, including a 12-in. display, a keyboard, a processor module, a power supply, 512K bytes of RAM, a 10M-byte Winchester disk drive and controller and a 630K-byte diskette drive, costs $7,795.

More information is available from NCR, which is located in Dayton, Ohio 45479.

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the differences among computer systems on the market.

Then there is the question of who should develop such a standard benchmark. The usual standards organizations are painfully slow in developing standards.

Chances are a benchmark developed by any of the standards organizations would be far out-of-date by the time it was released to the industry. And there is no indication that any of the standards organizations are willing to step into the snake pit of processor performance.

Even if a reasonable benchmark could be developed, you can bet the companies that fare poorly under it will contend the benchmark does not accurately represent the benefits of their systems. They will probably call the benchmark unfair and meaningless.

The fact is, processor performance is not an issue that can be accurately quantified in global terms. There are many theories on the best way to measure performance; all of them can be debated. Vendors will, in most cases, pick the rating method that puts their product in the best light. For the user, attempting to evaluate performance can be difficult, time-consuming and expensive.

SPECIAL REPORT

Minis and small business systems

When the going gets tough

August 27, 1984

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

SPECIAL **REPORT**

The tough get going: Minis adapting to change

Machines' survival an uphill battle as minis get squeezed at both ends

By Tom Henkel
CW Staff

The segment of the computer business that has undergone perhaps the most dramatic change in the past two years has been the minicomputer marketplace.

With the mini assailed at both the high and low ends by newer technology products, the traditional definition of a minicomputer — a 16-bit general-purpose computer system — has become a blur.

Powerful 32-bit superminicomputers, which over the past few years handily took over much of the scientific and engineering market for minicomputers, are now being repackaged in small configurations for office or stand-alone use.

Data General Corp., for example, recently announced several specialized versions of its 32-bit MV/4000, MV/8000 and MV/10000 32-bit systems for stand-alone graphics uses. Furthermore, DG unveiled a specialized configuration of its MV/4000 — the MV/4000 SC — as a small office system.

One of the originators of the 16-bit mini, Digital Equipment Corp., has also unveiled low-end versions of its successful 32-bit VAX product line, such as the Microvax-1 and VAX-11/725, which appear to offer performance superior to that of older technology minicomputers.

Based on the encroachment of 32-bit superminis at the high end and of microcomputers at the low end, many industry watchers have predicted the eventual demise of the minicomputer. So far, in spite of being steadily battered by newer products, the mini has not keeled over.

A huge installed base, such as that of DEC's PDP-11, and a performance niche between microcomputers and mainframes seem to keep minicomputers alive, noted Maureen Fleming, an analyst with Norwalk, Conn.-based International Resource Development, Inc. (IRD). Fleming added that the performance gap between mainframes and minis seems to have widened somewhat in the past few years.

The reason the performance gap has widened, explained Skip Bushee, executive vice-president of Infocorp, a Cupertino, Calif.-based market research firm, is that in their haste to break into the more fertile markets of 32-bit superminicomputers and microcomputers, makers of traditional minicomputers have virtually abandoned the market for reasonably inexpensive multiuser systems. This has left an attractive niche for entrepreneurial microcomputer firms selling multiuser microcomputers.

Now, Bushee noted, the major vendors are trying to get that low-end multiuser business back. The market analyst noted NCR Corp.'s Tower and I-Tower products, IBM's System/36 and newly unveiled Personal Computer AT and DEC's Microvax-1 as examples of fairly low-cost multiuser products recently introduced by major vendors. But Bushee noted that the solutions most vendors use to attack the multiuser small system problem look more like souped-up microcomputers than minicomputers.

But that does not mean the demand for traditional 16-bit minicomputers has completely died off, either. Fleming noted that there still appears to be a market for 16-bit minis as components of specialized systems or as systems aimed at vertical markets.

Dale Kutnick, an analyst with the Boston-based Yankee Group market research firm, noted recently that minicomputers also appear to have a bright future as file servers in complex system configurations attempting to link microcomputers with corporate mainframes.

But while it seems that minicomputers will, at least temporarily, survive the predictions of doom, survival still appears to be an uphill battle.

The latest wave of products from microcomputer vendors, supermicrocomputers, is aimed directly at the multiuser, small (or departmental) business applications that made the minicomputer popular.

Based on the encroachment of 32-bit superminis at the high end and of microcomputers at the low end, many industry watchers have predicted the eventual demise of the minicomputer. So far, in spite of being steadily battered by newer products, the mini has not keeled over.

A recent International Data Corp. (IDC) report noted that one selling point that allowed the minicomputer to gain ground on larger systems was the willingness of minicomputer vendors to provide user "handholding" or assistance in using or configuring minicomputer systems. Now, IDC noted, many microcomputers are so easy to use they do not require specialized instruction. Furthermore, many microcomputer systems come in preconfigured packages, eliminating the chore of buying a system and peripherals.

In 1982, minicomputers comprised 66% and supermicrocomputers 6% of the small business systems marketplace, noted a recent report published by Electronic Trends Publishing in Cupertino, Calif. By 1987, the report said, there will be a dramatic shift in those percentages, with supermicros holding 48% of the market and minis being reduced to 18%. IRD's Fleming predicted that the supermicrocomputer market, with 1983 shipments of 52,500 units (worth approximately $780 million, will zoom to 850,000 units (worth approximately $6.4 billion) by 1993.

But Fleming was quick to point out that the healthy outlook for supermicros will not come entirely at the expense of minicomputers. In fact, the industry changes prompted by multiuser microcomputers may, at least temporarily, boost the demand for minicomputers, she said.

Many companies rushed out to buy stand-alone microcomputers, Fleming explained, and they are now finding them lacking as a business solution. For example, it can be cumbersome to transport floppy disks physically from one office to another to exchange information with co-workers. Likewise, microcomputer users, when not seated before their systems, do not have immediate access to the information stored in those systems. And from a corporate standpoint, stand-alone microcomputers can be a security risk.

For those reasons, Fleming said, the market for multiuser systems will be hot throughout the decade. The question that remains is whether the so-called supermicrocomputers are an extension of the popular microcomputer marketplace or a metamorphosis for the 16-year-old technology of the 16-bit minicomputer.

Final assessment

From an architectural standpoint, supermicrocomputers clearly belong to the microcomputer genre of machines. From a functionality standpoint, the units offer performance and functions similar to a minicomputer. In the final assessment, the determination of whether supermicros are considered minis or micros may boil down to which approach can be more successfully marketed to users.

Sandy Gant, a senior analyst with Infocorp, noted that microcomputer users appear to be somewhat standoffish when it comes to buying minicomputers.

Gant cited Infocorp research that asked potential buyers of multiuser systems what features they wanted. The potential users described features typically available on minicomputers.

Infocorp then asked systems retailers what users actually purchased. The dealers said users coming from the stand-alone microcomputer environment felt they were being sold too much power when it was recommended that they buy a minicomputer, and they felt more comfortable with a microcomputer-based product.

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SPECIAL REPORT

Wholesaler acts as system reseller for affiliated stores

OAK BROOK, Ill. — When Ace Hardware Corp. decided to offer a computerization program for its 4,500 stores, the 60-year-old company, based here, became the first major hardware wholesaler to sell computer systems directly to its store owners.

Bob Lautner, retail systems manager for Ace Hardware, said store owners were aware of the benefits of computerization before the corporation began offering systems. "For a long time, virtually every single computer manufacturer had been knocking on dealers' doors with a long list of products addressing their needs and requirements," he said.

"We decided to help dealers make the best possible business decision by offering a program at the corporate level," Lautner added. "We knew we could help them avoid mistakes, and we wanted to pass along the savings of co-op buying and offer systems that had been designed specifically for Ace Hardware dealers."

Ace talked to numerous dealers and gathered information on the applications the dealers said they needed most. "Dealers needed information to make better buying decisions, establish tighter control of receivables and manage inventory and cash flow — an entire range of business applications," Lautner said.

In providing systems for those applications, Ace required a variety of hardware configurations to meet the different needs of individual Ace dealers. Yet the same software had to run on each system offered so the company would not have to develop numerous sets of software and so dealers could easily upgrade their hardware. "We wanted a manufacturer that offered a family of products with full software compatibility," Lautner said. "In addition, we needed a strong service and support organization for our dealers." After reviewing numerous vendors, Ace chose Texas Instruments, Inc. Ace became an authorized TI reseller in early 1981.

Ace combines software with TI hardware in the Profit Analysis Control and Efficiency (Pace) system. The system includes accounts receivable, accounts payable, payroll, general ledger, inventory management, sales analysis, purchase order processing, mailing list management and point-of-sale (POS) applications. It is available in three configurations.

The Pace I system is a TI Business System 372 with a terminal and 256K bytes of random-access memory, 42M bytes of mass storage and a TI Model 810 dot matrix printer. It can support up to six TI printers and Model 931 terminals. The higher end Pace II system is a TI Business System 661, capable of supporting up to 12 Model 931 terminals. It has 96M bytes of mass storage. In addition, Ace recently began offering the Pace/PC system, incorporating the TI Professional Computer.

Store operators who use the Pace system have found that inventory control is one of its more useful features.

Mike Watson, manager of Springbrook Ace Hardware in Bloomingdale, Ill., said, "My Pace II system tracks inventory from the time we order merchandise to the time we pay for it." The system keeps inventory records and purchase order records and automatically generates price tickets. When merchandise is received, prices stored in the system are checked against the manufacturer's invoice. Once approved, the invoice goes to accounts payable and to the general ledger file.

For Don Maxbauer of Ace Hardware in Traverse City, Mich., better inventory control means that his store's volume can grow, without the need to add employees. "We can substantially increase our volume without raising our overhead because of the computer system's inventory control," he said. The store expects sales of $2 million in 1984.

Mike Holloway, owner of Ace Hardware Home Center in Lafayette, Ind., uses inventory reports from his Pace system to make decisions in ordering merchandise. "With information from the Pace system, I am shifting from ordering primarily from the warehouse to making more orders on a 'drop-ship' basis, where I have a better margin of profit," he said. Profit margins can vary by up to 10%, depending on whether items are ordered directly from the manufacturer or from a warehouse. However, since drop-ship orders from the manufacturer typically require larger volumes than warehouse orders, Holloway must be certain the merchandise will move quickly.

"Once you know how many of a particular item you're selling, you can make a decision how to buy it," he said. "With the system, I can analyze variables and make the best decision."

Some Ace Hardware stores use the (POS) application, which links their cash registers to the Pace system. With this application, inventory control is complete: Merchandise can be fully tracked from the day it is ordered to the minute it is sold.

Maxbauer said that adding POS application to his system could ultimately save more than 100 man-hours a week that are currently spent physically counting inventory.

Drugstore chain's philosophy dictates decentralized system

WALNUT CREEK, Calif. — The management of Longs Drug Stores, Inc., a $1.2 billion drugstore chain with 178 stores in six western states, believes in decentralization. Each Longs store is run almost as a separate small business, with the store manager making his own purchasing and pricing decisions and ordering merchandise directly from distributors and manufacturers rather than from a central corporate warehouse.

Longs also believes in decentralized computing — and that's where minicomputers and fourth-generation software have assumed key roles, according to Bill Gates, Longs' information services manager. The company is in the process of installing a Hewlett-Packard Co. HP 3000 minicomputer in each store and recently signed an agreement with Ottawa-based Cognos, Inc. to purchase as many as 178 copies of Powerhouse, a fourth-generation development language.

Longs is one of the nation's first major chains to implement a distributed computing system. Thirty HP 3000 Series 39 and Series 40 systems are distributed among Longs' northern California stores, with two or three stores sharing each machine via telephone lines. About one-third of Longs' stores are currently using the HP 3000 network for pharmacy management and sales accounting.

Because there are no operators in the stores, console operations must be done either programmatically by the system or via remote intervention from company headquarters here. All store peripherals were carefully chosen to be easily operable by nontechnical personnel.

Longs plans to install systems in its stores at the rate of two a week once the new HP 3000 Series 37, nicknamed the Mighty Mouse, becomes available this fall. Each store will have its own Series 37, which will be the smallest machine of the HP 3000 series.

Pharmacy manager Jerry Morris helps customers at Longs' Moraga, Calif., store, one of 30 Longs pharmacies in California using an HP 3000 system.

Planning for the computerization of the drugstores began about four years ago. Because ordering, inventory, sales accounting and other operations are done locally, the company concluded that the best long-term solution was to install a minicomputer in each store. A distributed minicomputer system would relieve headquarters from maintaining unnecessary details about store operations and reduce telecommunications costs and phone line problems.

Each Longs store averages about $7 million in annual sales, has about 50 employees and handles a broad range of products including hardware, appliances, cosmetics and general merchandise as well as pharmaceuticals. The need for substantial local computing power was one factor in Longs' decision to stay with HP 3000s, which its DP department had been using exclusively since replacing NCR Corp. mainframes in 1974. At that time, however, there was no HP 3000 model inexpensive enough to be placed in every store.

"The HP 3000 is a powerful multipurpose minicomputer, which is what we needed," Gates commented. "We were familiar with the computer, and we had software for it. So we bet on the price going down."

While waiting for technology and the market to catch up to its needs, Longs began building a remote network of larger HP 3000s, each of which could be shared by several stores. This allowed the company to create and implement initial applications while developing the expertise required to support a large, nonprogrammer user community and a network of minicomputers in operatorless environments.

The first store application Longs brought up was its pharmacy management system, initially installed in 1982. Sixty stores now use the Prescription Processing System to fill prescriptions, print labels, maintain customer records, price prescriptions, keep inventory, bill third parties such as Medi-Cal — California's state medical plan — and provide management reports. All input and operation is done by pharmacists and pharmacy assistants.

With about 130 stores to automate by the end of 1985, Longs feels that the use of fourth-generation software is an essential part of its computerization strategy. Powerhouse was chosen by Longs as the standard for all store systems.

"The user-friendliness of Powerhouse is very important to us because we have several thousand users in the stores, and few of them have previous computer experience," Gates noted. "Powerhouse also enables us to standardize the screens and the way people interface with the system. This is critical because training and support are massive problems

See LONGS SR/4

LONGS from SR/3

with so many installations."

Quick, the Powerhouse screen generator, is used to enforce standards developed for function keys, error messages and other user interactions. Longs' goal is for all screens to look and act similarly as far as the users are concerned. "Quick is a very powerful screen generator," Gates said, "and it's the key to the interactions that occur in the stores."

Powerhouse is used for all screens and reports in the pharmacy system, whose core interactive program was written in Cobol before Longs' decision to standardize on Powerhouse. Many of the reports for the Prescription Processing System were written by the pharmacy's chief user, a pharmacist who had no computer experience prior to being trained in Quiz, the Powerhouse report writer.

In each store, about eight users must be trained to use the pharmacy system. Longs found that four hours of individualized instruction are required for each user. After initial training, users are supported with phone-in consulting during the hours the pharmacies are open.

"The pharmacy staff likes the system," Gates said. "If they didn't, we couldn't get it installed. We had to sell it to them at first, but now the stores are pressuring us to come out and put the system in."

A competitive factor

In-store computing is increasingly a competitive factor in the drugstore business, according to Gates. Longs' pharmacy system makes its stores more attractive to doctors by providing patient prescription history information and by monitoring factors such as drug interactions.

A sales accounting system written entirely in Powerhouse was installed in many of the automated stores this summer. Data on sales of both pharmaceutical and nonpharmaceutical products is keyed in at each store and kept locally for management reporting. Every night, summary data is sent, via dial-up lines, to the general office in Walnut Creek to update the corporate general ledger.

Powerhouse applications currently under development include payroll, inventory, order entry and management reporting. Gates cited the software's prototyping capabilities as another strong reason that Longs chose Cognos' products for all store applications.

"About 20 other applications are planned for use in the stores," he commented, "and it's hard to sit in the central office and visualize how the system will be used. With Powerhouse, it's easy to prototype screens, make changes and use the data dictionary for validation."

Innovative techniques

The absence of operators or other DP personnel from the stores has required innovative systems management techniques. Performance monitoring is built into Longs' software and handled remotely. Console operator tasks are performed automatically by software routines or done over dial-up lines via the HP 3000's remote console facility. The stores use small Okidata Corp. printers, which have proven reliable and make it easy for users to change ribbons and paper. For backup, store users only have to insert and remove a tape cartridge.

Longs found that fourth-generation software meets a broad range of computing needs in a minicomputer environment. The company's 60-member DP department has six HP 3000s (Series 68, 48 and 40) networked together and uses Powerhouse heavily for applications ranging from capital asset depreciation to management reporting.

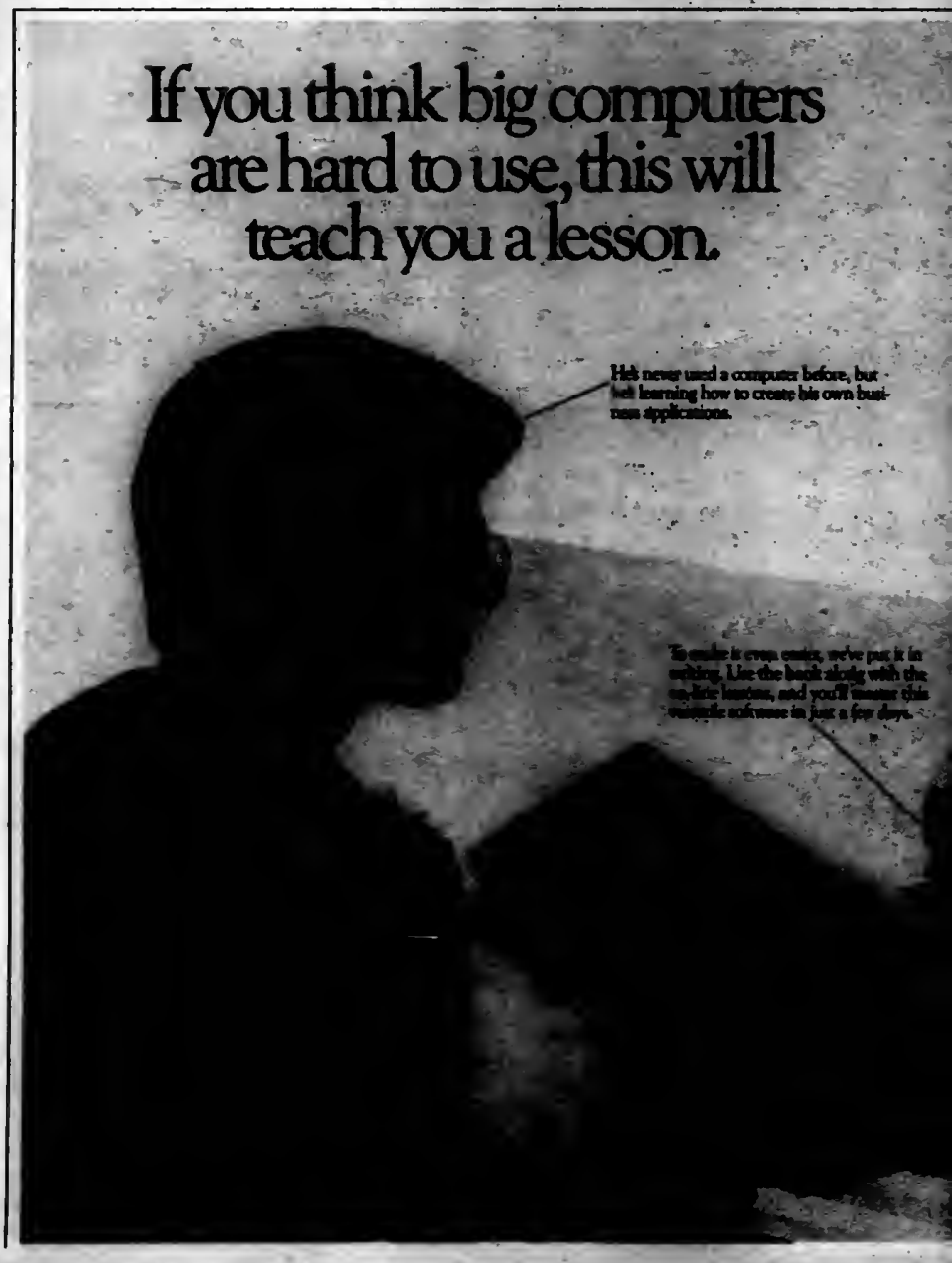
Most new systems at Longs' general office use Powerhouse. In addition to increased productivity in the development cycle, Gates noted, Powerhouse has the ability to work with existing Cobol systems. Longs has used the product since it was first released in 1979.

Longs pharmacist uses the HP 3000-based Prescription Processing System.

Longs' headquarters is highly computerized, with 260 terminals. The company's electronic mail system, which employs HP's Desk Manager product, has recently been installed in the firm's automated stores.

In Longs' personnel, accounting and merchandising departments, non-DP staff members use Powerhouse to write reports from various data bases. According to Gates, several high-level executives are avid computer users and have been testing Cognos' menu-driven report writer, the Expert.

"Longs is the most decentralized retail drug chain in the country," Gates said. "That calls for distributed computing, and we decided against mainframes 10 years ago. We needed a very sophisticated computer in our stores because we were replacing a well-tuned manual system. Until recently, that type of computer was just too expensive. We had to wait for the technology."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SPECIAL REPORT

Smart marketing can save the mini from extinction

By Robin Retallick
Special to CW‡

Within an order of magnitude, there are about 500,000 minicomputers installed in the world today, and the forecasts are that installations are currently doubling about every five years. More than 75% of these are stand-alone, single-system environments being used for general-purpose applications — finance, distribution and manufacturing.

But the rate of change in the world has moved up a notch.

Retallick is president of Johnston, Brown & Associates, Inc., an Oakland, Calif.-based consulting firm.

As 1983 was the year of change, and 1984 will be the year of the crunch for micros, so 1985 and 1986 will likely be the same for the mini. As with the micro, the stakes will rise rapidly until sales of the multiterminal $20,000-to-$200,000 system is in an arena in which only the big boys can play.

The survival of the minicomputer is simply a question of how long the continuing perception in the marketplace that minis provide good value exists. This perception will derive both from the actual function/price ratio — how will the minicomputer really stack up against the supermicro — and promotion — will there be strong promotion of the mini or of one of the competing alternatives.

The current crop of minis probably has upward of 200 man-years of system software development behind it. For a complex system like the IBM System/38, this figure is probably closer to 4,000 man-years.

What does all this software do? Essentially, it provides the elements for controlling a multiscreen, interactive processing system — data management, security management, device management and work management.

Why, therefore, is this function under attack? Because the advantages of scale with automated manufacturing have brought the cost of the micro (with all its attendant processing power) down to the cost of a dumb terminal. This is now leading to a race of supermicro controllers and operating systems being developed with the assumption that there is intelligence and data storage in the terminal.

Any manufacturer who ignores marketplace attitude, image or prejudice is in peril, and a mature approach to marketing will be key to ensuring that attitudes favor one product or another.

While genuinely good product function is ultimately the key to success, severe distortions in the market can result from heavy promotion. Witness the micro advertisements that have generated an attitude among many small business owners or department managers that $5,000 worth of hardware and $500 of software are going to automate the business. And if one machine will not do the job, then two or three . . . will be the answer.

Marketing is a relatively recent phenomenon. As an important function requiring mature handling within an organization, it is less than 20 years old. Any mini contender who does not organize appropriately will be at a severe disadvantage competing with those who do.

There is no evidence from today's mini manufacturers that this is being done.

In this market, the entry price for a new product promotional launch is probably about $200 million, with an ongoing annual rate of about $100 million.

There are not too many contenders who can play in this league. But what a tempting market for any of the heavies to aim for — bearing in mind that there are going to be a lot of micro users out there with a crying need to link to something that works well. And with a relatively inexperienced audience, heavy promotion could easily create an image of product equality or superiority and at a lower product cost.

The big question is — who is going to be the first to move?

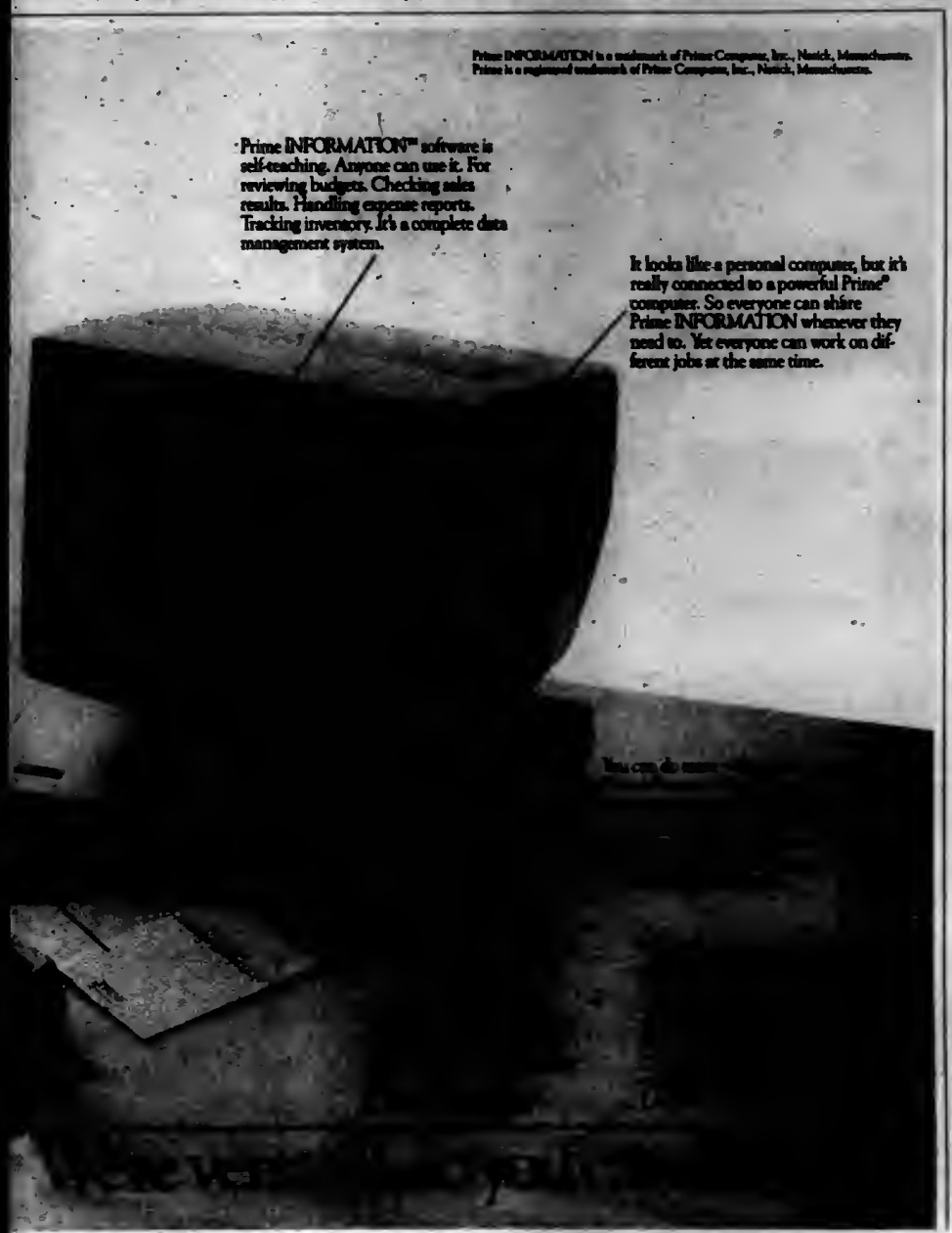
IBM obviously has much to gain from being first. It could enhance the System/36 and System/38 to embrace the Personal Computer efficiently as a terminal and begin strong promotion. However, since such a move needs organizational open-heart surgery, this is unlikely to happen until the pain level gets higher.

AT&T has a need to do it, but it also has the problem of reorganizing to a marketing approach — a tall order for a company moving from a guaranteed market.

The Japanese companies have traditionally not used the frontal approach and may prefer to watch the market and move at a later date — or simply remain as component suppliers for those taking the plunge.

For those brave enough among the smaller mini suppliers, the possibility of mergers, acquisitions or capital injections could equip them to operate in the big league.

The fact remains, however, that the mini world is the next tempting and conquerable frontier. In this land of opportunity for the high-tech entrepreneur, and in the midst of the high-fashion micro and all its tempting possibilities, it seems unlikely that someone is not going to get serious about it.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SPECIAL **REPORT**

Spreadsheet package manages complex records for utility

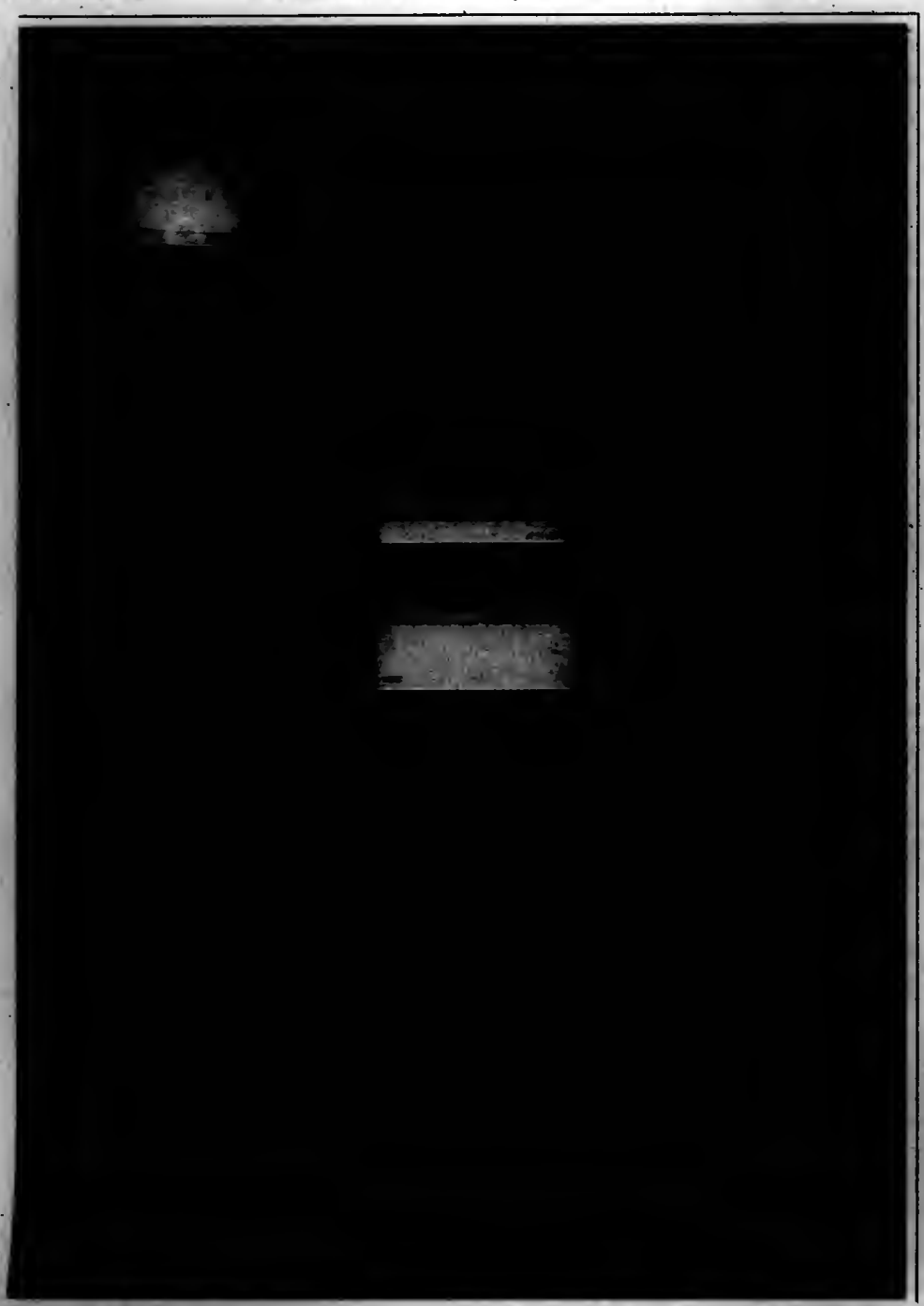
BROCKTON, Mass. — Eastern Utilities Associates (EUA) had good reason for seeking to automate compilation and calculation of a document involving nearly 2,300 separate entries during each 24-hour period. Almost 500 of the entries on EUA's daily load record are based on meter readings or the results of other calculations.

EUA is an electric utility holding company. Its retail subsidiaries provide electric service to 230,000 customers in Northern Rhode Island and Southeastern Massachusetts. Its wholesale generating and transmission subsidiary provides the electricity those retail subsidiaries sell. In addition, the EUA system is interconnected with other New England electric utilities through the New England Power Pool (Nepool).

It is from a daily load record that EUA calculates how much power its system exchanges with other Nepool utilities and how much energy each of its subsidiaries draws from the system.

Robert P. Tassinari, EUA's vice-president for operations, explained that the daily record tracks, on an hour-by-hour basis, EUA's internal power load as well as how much electricity EUA buys and sells.

Until early 1983, the daily load record was recorded and calculated manually — a monumental task requiring as much as 12 to 15 man-hours every day.



Once the decision was made to automate the daily load record, a survey of computer-based spreadsheets was conducted. It appeared that a stand-alone microcomputer would be needed.

"What we needed was a powerful spreadsheet package," said Edward Bonetti, EUA's supervisor of technical support services. "But the sheer size of the spreadsheet we needed — roughly 500 by 400 cells — seemed likely to overwhelm a stand-alone unit."

When Bonetti learned of the Supercomp-Twenty spreadsheet software from Access Technology, Inc. in Natick, Mass., several of its features appealed to him. "We liked the fact that developed spreadsheets were transportable, because Supercomp-Twenty would run on several different vendors' computers. Additionally, the package seemed capable of accommodating the very large matrix we proposed to put on it, and, finally, it would run on EUA's existing Prime Computer, Inc. system." The system, a Prime 750, has a 2M-byte memory capacity and 300M bytes of disk storage.

"A lot of people believed it would be impossible to do this with a spreadsheet package," Bonetti recalled. "A common belief was that the sheer complexity of the daily load record . . . would require a program in some conventional programming language."

Access Technology, too, saw EUA's application of its software as a major test. "Right from the start, they said no spreadsheet of this size and complexity had ever been done before," Bonetti said.

But the system has worked out well. Robert Durand, the analyst responsible for designing and developing the program, said he was pleasantly surprised at the comparative ease with which he developed the project.

And, according to Michael DiBenedetto, supervisor of EUA's power management section, "It's helping us reduce our daily energy costs and save our customers money."

Bonetti (left) and Durand confer in power control room.

SPECIAL **REPORT**

In-house system spices up French's coupon program

ROCHESTER, N.Y. — By streamlining its mailing operation, R.T. French Co. here has achieved savings significant enough to guarantee that its coupon redemption programs cut the mustard.

Coupon programs have been the keystone of marketing strategy for decades at R.T. French, the nation's largest producer of mustards.

As the volume of French's offers began to mushroom and as postal rates rose, the redemption programs became far more costly and difficult to manage. To keep the coupon campaigns viable, the company ordered a top-to-bottom analysis of the entire redemption cycle.

The people at R.T. French spotted a situation crying for computerization, and it did not take long to get agreement on this point. After a survey of systems on the market, the company chose the VS80 minicomputer from Wang Laboratories, Inc.

Since the VS80 went on-line, R.T. French has realized a better than 50% savings in its bulk postal payments. Added economies have come from eliminating duplicate redemptions and from a series of down-the-line operating efficiencies, according to Marlene Cummins, manager of consumer relations.

"These programs are vital to us in many ways," Cummins said. "They provide good value to consumers while they create and build good will. So, there was never any question of the programs' actual survival. Still, in order to maintain a skyrocketing level of activity, we had to get a better handle on our operations."

As the first step toward this goal, Cummins said, she contacted representatives from Wang, who in turn introduced her to Genesistems, Inc., an independent software company based here. Proceeding from requirements she had outlined, hardware and software specialists at Genesistems worked with Wang support staff and developed an integrated data management program based on the VS80.

The efficiencies engendered by the system enabled R.T. French to go from first-class to bulk-rate mailings, thereby reducing its per-unit postage costs from 20 cents to 11 cents.

Cummins said the benefits of the system did not end at the bottom line, however. "We've achieved remarkable accuracy in our mailings and far better control over every aspect of the fulfillment operations.

"The new system has also reduced the volume of complaints from our customers," she continued, "because the frequency of errors in the mailings is reduced. If errors do occur, the system lets us correct them quickly. We are also getting responses out to consumers much more quickly."

As a result of the system, we always know what is being spent at each stage of a promotion," Cummins added. "Being able to track cost-to-date and to update other information enhances the marketing department's ability to present timely information to the top decision makers in the company."

During any mass-mailing redemption campaign, R.T. French usually receives some complaints that refund checks were not received. With the computerized system, fulfillment staff can run these individuals' names through the data bank, where every refund check is recorded with the name of the payee and a record of when, or if, the check was cashed. In 90% of the cases, the check has been cashed, and when the check is retrieved from the files, the signature on the letter and the endorsement match.

In addition to monitoring redemption procedures, the Wang VS stores the names of respondents, addresses envelopes and sorts mailings by Zip codes for bulk-rate mailings.

"When we proposed the Wang system to management," Cummins said, "we were able to anticipate concrete savings in labor costs. But the economies that really swung management to Wang were obvious when we proved the system would let us handle mailings efficiently in bulk. By getting away from first-class postage, we showed how the machine could pay for itself in less than two years. The VS80 arrived in October 1982, and we are running ahead every month on our cost-justification forecasts."

The thousands of consumer numbers and addresses logged into the VS80 every week at R.T. French are a very valuable asset, according to Cummins. She said the monthly totals and trends enable the company to identify offers with the greatest appeal to potential customers. These determinations are also useful in forecasting response rates for future offers.

While Cummins acknowledged that "there are many fine fulfillment houses across the country," she said that R.T. French prefers to handle coupon fulfillment on an in-house basis.

That way, she said, the company is able to get closer to its customers, spot problems more quickly, respond more efficiently, develop more premium offers and improve the per-unit cost quotient.

This latter capability is particularly important, she said. "The Wang system lets us get a better reading on the true costs of our redemption and refund programs."

Shortly after the VS80 went into operation, staff members in the company's Information Service Department began to develop a series of expanded applications for the system. As a result, the system has been upgraded to a VS90.

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SPECIAL **REPORT**

Minicomputers enjoying full life at American School

By Jeffrey Katz
Special to CW‡

WEST HARTFORD, Conn. — With the help of volunteers, the minicomputer is alive and well at the oldest school for the handicapped in North America. The American School for the Deaf (ASD) here has been using minicomputers since late 1981 for a variety of educational and administrative processing. All of the programming has been done by volunteers from local industries. Systems that have been implemented to date range from student administrative projects through adult vocational education and include programs for this private school's fund-raising activities.

The school's involvement with minicomputers began in the summer of 1981, when Southern New England Telephone Co. donated two Perkin-Elmer Corp. 7/16 computers that had been part of an old private branch exchange (PBX) test system. The school's director of communications and data processing, William Yoreo, contacted local PE salesmen to determine exactly what was donated and what was required to make the computers useful for a small data processing application. Computer experts from United Technologies Corp. and Combustion Engineering, Inc., both of which use PE equipment, were contacted, and this resulted in two more corporate volunteers.

Three 10M-byte disk drives, several video terminals and current loop communications interfaces were purchased to complete the system. The two donated computers contained 64K bytes of core memory, two nine-track tape drives and custom interfaces for the original application. The computers and tape drives, along with the newly purchased disks, were repackaged in standard vendor cabinets, and the ASD data center was up and running.

Phone system upgrades

About the same time, the school was upgrading its telephone system to an AT&T Dimension PBX. Additional pairs of wires were allocated in the new cables being run around the campus for remote terminal use. It was felt that the distances involved could be handled with direct current loop serial interfaces, eliminating the need for short-haul modems and reduced transmission rates. The remote campus terminals consist of PE 550 terminals, bidirectional RS-232-to-20 mA current loop converters and an eight-line current loop communications multiplexer as the computer interface.

Using Basic and Fortran IV, programmers began on the initial target applications: budget information and tracking and student scheduling. The operating system used was PE's OS/16 with a resource-sharing option. That system was adequate only at first.

As in many instances of initial computerization, once key management people saw the benefits of automated reports, the requests for applications had to be fought off. It was apparent that while the 16-bit computers were successful, their limitations in program size and time-sharing were hampering the school's DP growth. Fortunately, senior PE corporate staff members were introduced to the school and its situation.

Using mostly volunteer help and donated equipment, the school had constructed a viable data center and had written an initial suite of programs within a year.

PE, which has its corporate headquarters in Connecticut, arranged for a further donation of a Model 7/32 minicomputer. The 32-bit machine came with 512K bytes of main memory and could use all of the peripherals and interfaces on the 7/16 system.

The new 32-bit-based data center, relocated for additional space and security, now supported four to six users at a time, without the data center being called with the question and complaint: "Who's using all of the memory? I can't get in."

At this point, near the end of 1982, applications grew, and user sophistication increased.

The hardware configuration of the system today includes:

- The PE 7/32 processor with 1M byte of 750-nsec core memory.
- Floating-point hardware.
- Five 10M-byte, 5440-type PE disk drives. Each drive has 5M bytes fixed and 5M bytes removable. There are multiple disk controllers and direct memory access ports.
- Two nine-track, 45 in./sec, industry-standard, magnetic tape Pertec Computer Corp. drives. These are mostly used for disk backups and file exchanges.
- Five PE Model 550 CRT terminals, some located around the campus.
- Two Bell 212A modems, with software support for dual transmission rates.
- Two Digital Equipment Corp. Decwriter III terminals with 180 char./sec bidirectional print, which

Katz is supervisor of the System Software Group at Combustion Engineering, Inc. in Windsor, Conn. He has been a volunteer at the American School for the Deaf's computer center project, providing hardware and data communications engineering.

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the school uses as printers.

Applications currently running on the 7/32 system, using the OS/32 operating system and Fortran VII, include a budget system, inventory, student scheduling and student grades. Most applications originate from the executive director, Winfield McChord; the assistant director, Ed Peltier; or the financial director, Thomas Rubbo.

The school's philosophy regarding the data center resource — both the hardware and the volunteer software support — has been to share what it has with other nonprofit and educational institutions.

Mailing lists are maintained and printed on the system for several local nonprofit groups. Some local Fortune 500 companies and an arm of a federal agency have been provided use of the American School's system. PE sales people used it when their office machine was off-line, and the system has been used by the Connecticut Department of Civil Preparedness.

The system's main attraction is its location near Hartford, its dial-in access and the school data center's policy of providing free use — within reason — to those who have helped the school.

The school also provides vocational training for teenagers and adults who are hearing impaired. Data processing is a natural career path for these people, as no aural communication is involved. Training has been in the area of data entry, and the placement and employer acceptance record has been excellent.

Instruction in programming on the PE minicomputer for some of the school's high school students has been taking place informally and will soon become more frequent, due to recent expansion of the 7/32's memory. The students' most direct computer contact now comes from several Apple Computer, Inc. Apple II microcomputers in the mathematics department. A PE terminal is located in the vocational education building now, and Apple-to-PE communications has been discussed.

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Multiuser system drives trucking firm's DP operations

SALT LAKE CITY — A year ago HD Delivery, a trucking and distribution firm based here, operated as a sole proprietorship with trucking operations from Salt Lake City and Ogden, Utah. In July, the firm incorporated and expanded its network of trucking stations to include three more Utah cities: Cedar City, St. George and Provo.

HD currently employs 30 people and operates 22 trucks used to deliver consolidated loads for major trucking firms throughout its home state and in 11 other western states. A multiuser desktop system allows the growing firm to keep a handle on its rate and scheduling information.

Foresight and advance planning in data processing have fueled HD's recent expansion. When Steve Middleton, HD's DP manager and chief accountant, joined the firm in February 1983, four secretaries performed all transactions and correspondence with hand-held calculators and standard electric typewriters.

An employee checks trucking manifest data at Omni terminal.

"I brought in my little [Radio Shack Corp.] TRS-80 for a few months," Middleton said. "But while it was great as a personal computer, it just wasn't at all satisfactory for the business environment at HD. After some careful shopping and a couple of unfortunate trials and errors, we discovered the Omni."

In November 1983, HD installed San Diego-based Digital Computer Corp.'s multiprocessor, multiuser Omni computer.

"I've operated at least 15 different systems since I've been in data processing," Middleton said. "For business operations, I like the Omni computer better than all the others. The Omni is fast and has many capabilities, and it has the ability to expand in a modular, cost-effective manner according to our needs."

HD selected the basic Series 2000 Omni system, a desktop unit supporting up to 10 users. This model came standard with an 8-bit, multiuser Turbodos Version 1.3 operating system from Musys Corp. and was prewired to accommodate up to two 5¼-in. hard disks with from 13M to 288M bytes.

Each user accesses an individual microprocessor located within the Omni on a dedicated printed-circuit board containing 64K bytes of random-access memory.

Middleton said, "We've been able to research back invoices quickly and efficiently, a service that our clients really appreciate."

HD runs most of its DP functions on its Omni system. It processes all accounts receivable and payable with Digital Computer's Omnidata, an accounting software package. Since all of HD's clients (mainly large trucking firms) have different rates, renegotiations are ongoing. "We use word processing [Micropro International Corp.] Wordstar software constantly," Middleton said.

Payroll is also handled with the Omni system. "With our recent incorporation, we're running two sets of books. The computer has kept right in step with our changes," Middleton said.

The backbone of HD's business applications software is a detailed and somewhat complicated manifesting program. "Even our programmer had a difficult time figuring out what we needed," Middleton confessed.

The manifesting program keeps track of shippers, consignees, delivery and shipping dates and billing status.

Record locking important

According to Middleton, "Omni's record-locking capability is very important in these manifests. It allows us to switch from user to user in preparing separate bills. Although there are at least two of us always on the computer, we've no worries of losing, duplicating or overwriting shared files."

But HD Delivery considers its bottom-line cost savings when it adds new users to be even more important than the speed and flexibility of its system.

"If we'd installed a personal computer local-area network system, each new person on the team would need a complete new personal computer, each costing between $3,000 to $4,000, plus the price of the networking medium," Middleton said.

"With our multiprocessor, multiuser system, we pay around $1,300 to add another user. And that price even includes the terminal," he continued.

HD realized this cost-saving advantage when an additional dock office secretary was hired recently. "Now she too has her own personal computer," Middleton said. The new employee prepares HD's own freight bills, with rates automatically determined by established schedules already in the data base.

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SPECIAL REPORT

When computers join a small firm's staff: Helping employees cope

By Joan Carr
Special to CW‡

"What's going on here? . . . Why is this happening now? . . . It's totally unnecessary! . . . What will happen to us?"

Comments from people in a natural disaster, possibly. Comments from employees on learning that their boss has surprised them with a computer that will be on-line in two days — probably. Some surprise; it seems the only one truly surprised is the employer — by the reactions of his loyal staff.

This situation is not as common in larger organizations as it is in smaller ones. The search, funding and contracting of a large system are more or less common knowledge throughout a large organization because there are a number of people involved. In a small business, the owner is often the secretary-treasurer, majority or total stockholder and procurement agent all in one. He is courted as the significant party by those who wish to sell him a system — and rightly so; he is doing the buying. After numerous demos, thorough explanations of what the system will do for his company and increasing enthusiasm, he is raring to go.

And herein lies the problem — all has been focused on the boss, but very little thought has been given to the impact computerization will have on employees and daily operations.

The most important asset of a small company is the loyal, somewhat long-time employee — he is also the one who will be affected the most and the one the company can least afford to lose.

The impact on employees will take three forms: physical and environmental; group and sociological; and personal and psychological.

Assuredly, a computer system will change the environment and the manner in which tasks are done — in a special area designed to accommodate cooler temperatures, on a CRT screen rather than on paper. People will be interacting differently as their jobs change to accommodate the system.

And last, but not least, the impact of computerization on the employee in a personal and psychological sense must be given much attention.

As employees adapt to the new system, interaction patterns will once again become regular and efficient, but this takes time and requires the support of management.

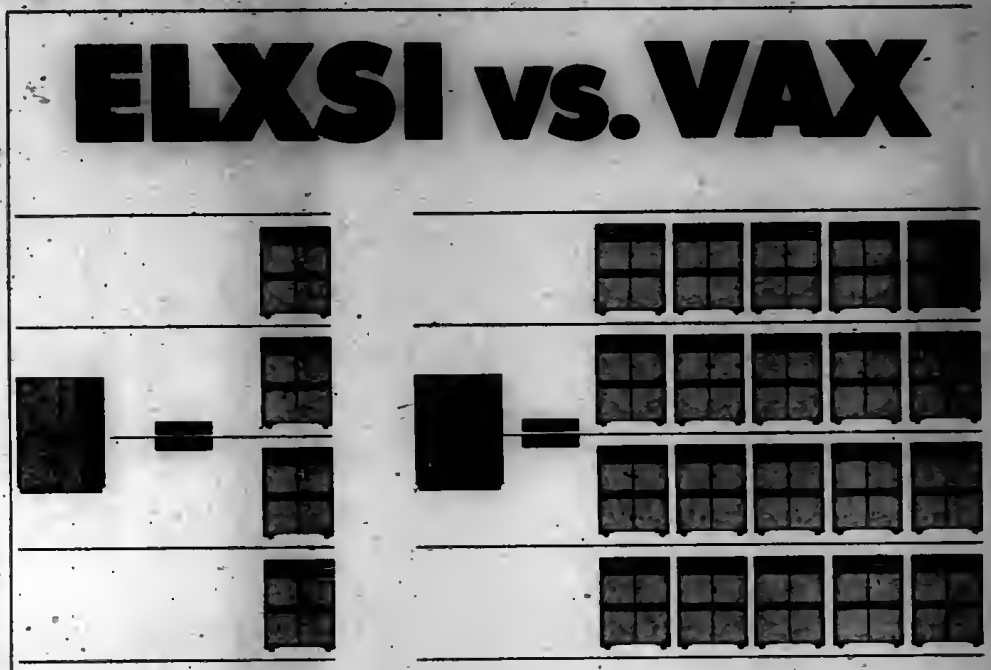
This last sounds rather obvious; after all, management bought the computer. But care must be taken not to confound these new patterns by giving employees conflicting messages, verbal or nonverbal. Do not ask, "Is it done yet?"; rather, "Let me know when you're done." Do not constantly interrupt or change procedures except when absolutely necessary. Learning, especially initial learning, is not facilitated by constant change.

If management presents computerization as an enhancement rather than as a change and makes that presentation in an open, informal setting, a number of things can be accomplished: rumor control, idea exchange and minimization of possible stressors.

A question-and-answer session and possibly a demo can give employees a part in this transition and also give them a nonverbal message: Management values staff as much as it values the computer.

This is a concept that tends to get lost during a transition, when the focus is on getting the system up and running, but is invariably recognized when a valued employee turns in his resignation. After all, the completely self-functioning computer has not been developed yet. The organization still needs people to run its computers, not the other way around.

Carr is a marketing planner for Custom Software Systems, a software vendor specializing in systems for Wang Laboratories, Inc. computers, in Jacksonville, Fla.



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NEW ORLEANS — Century Management, Inc. (CMI), a property management company here, owns and operates five hotels of approximately 100 rooms each — four in the French Quarter and one in New Orleans' Garden District — all within a five-mile radius of each other and the corporate office. The five properties — the Marie Antoinette, the Saint Louis, the Prince Conti, the Saint Charles and the Saint Ann — conduct all of their business functions on one minicomputer located at CMI's corporate office.

The system is an MDS Qantel System/64, and the software run on it is the Hospitality and Leisure system (HAL), also by MDS Qantel. The system includes full front-office functions, back-office accounting and payroll. Connected to the CPU via dedicated local telephone lines, each hotel operates as a separate unit, handling its own reservations, check-in, check-out, guest transaction posting, on-line guest history, travel agency statistics, accounts receivable, group and convention records, housekeeping, private branch exchange and full front-office reports.

The configuration consists of 41 terminals and 13 printers, including folio, line and letter-quality types, ranging from 120 char./sec to 300 line/min. Each hotel has three to four terminals and two printers on its premises. The System/64 itself has 1M byte of memory with a 150M-byte disk drive and streamer tape backup.

The five hotels can make reservations for each other either from the individual hotel or from the central reservations office at CMI headquarters. With six terminals and one printer for reports, confirmations, deposit requests and cancellation notices, the central reservations staff can access directly any of the five properties and display availability, rates, room types and guest history information, in addition to booking reservations. This not only increases the overall occupancy of CMI properties, but it saves time and telephone costs.

Julio Rios, vice-president of operations for Century Management, said, "Since our name recognition isn't as high as the major hotels, we have to find different ways to be competitive. We need up-to-the-minute, concise information on every aspect of our operation. And with five hotels, that's a lot of facts. We chose the Qantel HAL system because it can give us more statistics more quickly. We can have access to reports showing complete breakdowns by department. Each morning HAL gives us a detailed forecast of the coming day's or week's activities, putting us in a very advantageous position."

Accounts payable, general ledger and payroll for the hotels are handled at CMI's corporate office, consolidating the accounting functions under one controller.

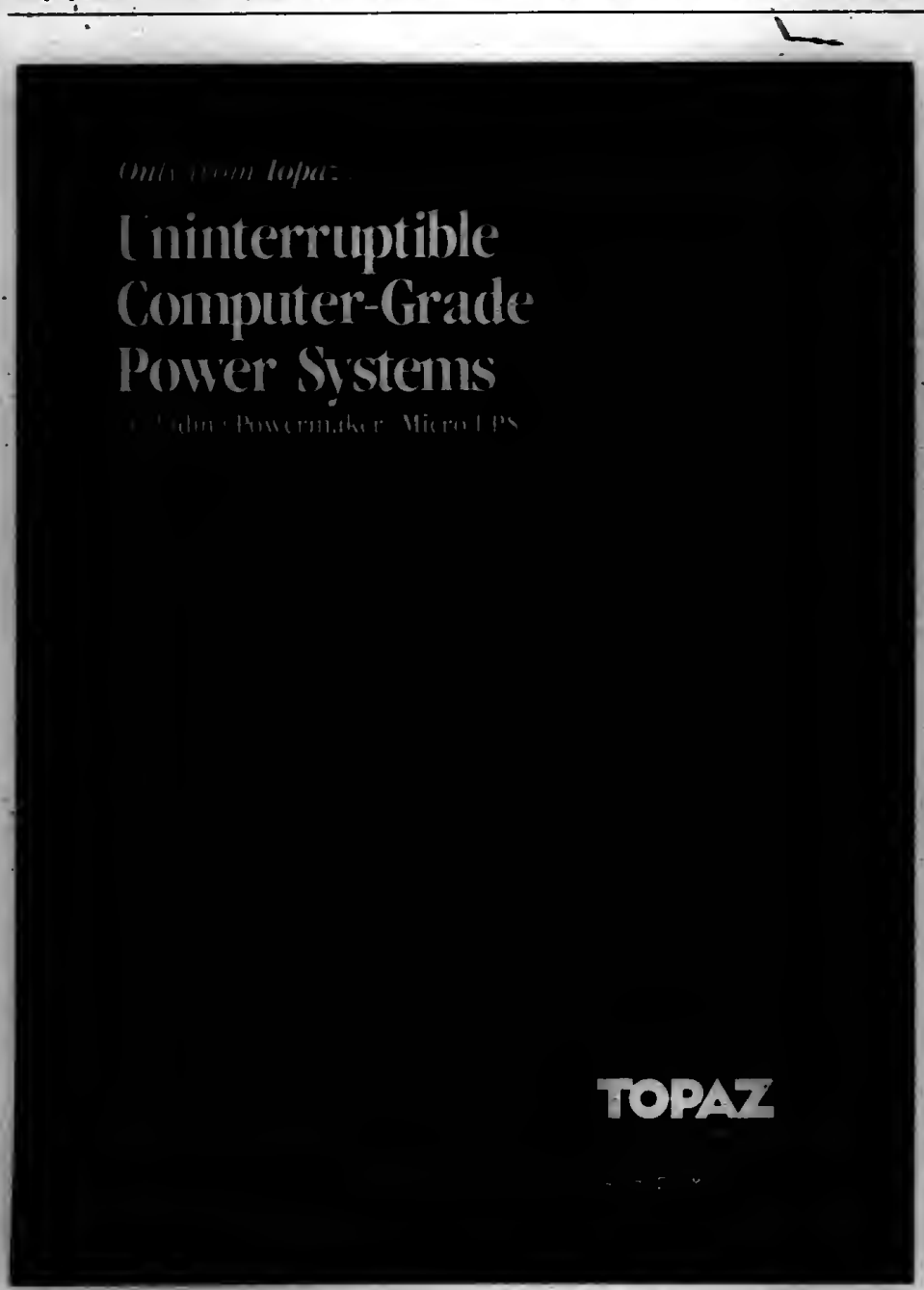
Centralized night audit

Night audit is also centralized at CMI, where daily reports for all five hotels are printed out and balanced, room charges and taxes are posted and departures and hotel statistics are updated for the next day's business by two auditors.

Additional software capabilities available for use either from the individual properties or from CMI headquarters include data based word processing for confirmations and promotional mailings and report generation for user-designed reports.

The CMI hotels were brought on-line last February with the installation of the back-office system, which includes general ledger and accounts payable. Payroll was added in early April, followed by the front-office system later the same month. All five hotels were brought on-line within a 10-day period, one property going on-line every two days.

The addition of telephone management and point-of-sale interfaces is planned.



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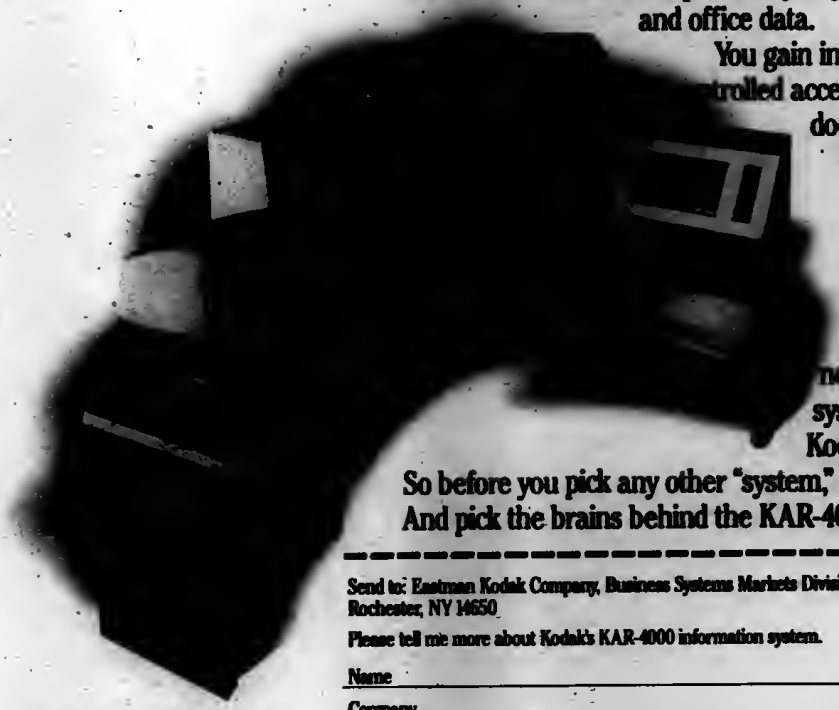

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SPECIAL **REPORT**

Crime-fighting minicomputer helps make solving cases

SANTA ROSA, Calif. — If Sherlock Holmes were sleuthing today, Watson would probably be the name not of his faithful assistant, but of his computer.

Although many law enforcement agencies have had computer-aided dispatch systems for years, it is only recently that crime-fighting computers have become a part of an agency's daily operations. In the Sonoma County Sheriff's Department here, detectives and patrol officers are likely to ask crime analyst Louise Anderson and the department's Morgan*System for clues in solving crimes.

Sonoma County is located about 50 miles north of San Francisco in the heart of California's wine-growing region. The county's population is approximately 330,000 people and growing, with the sheriff's department responsible for police services for 135,000 of these residents. In 1982, the department was a recipient of a state grant aimed at apprehending career criminals through the use of crime analysis.

Crime analysis is a new field of criminal justice research in which data elements from crime reports, arrest reports, stolen property lists, pawn slips, fingerprints and other criminal intelligence information are searched to provide answers to questions such as: "What is the most likely day and time for burglaries in beat 14?" "Is this piece of pawned property stolen?" "What known criminals drive black 1978 Chevys?" "Which robbers wear ski masks and use a .357-caliber Magnum in liquor store robberies?"

Answers are often found in the department's IBM Series/1 minicomputer, which has 512K bytes of main memory, two 64M-byte disks and six terminals available for crime analysis. An additional eight terminals are used by the county jail for on-line prisoner bookings and other jail management functions.

The system was installed in November 1982 by Search Group, Inc. of Sacramento, Calif., and within one month the system produced its first success — a match on fingerprints, found at the scene of a burglary, with a known burglar.

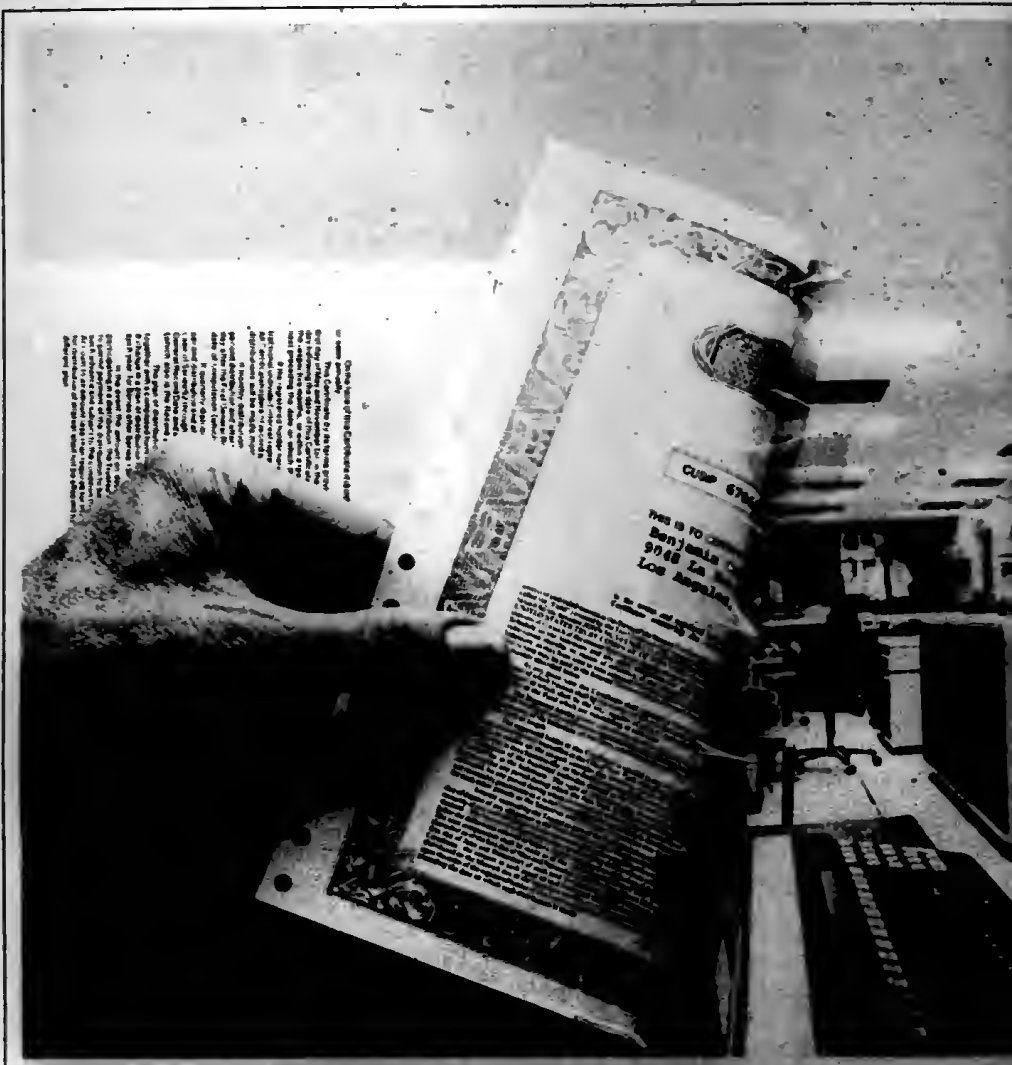
The system runs Morgan System software, which was orginally written in Cobol for the Lexington, Ky., police department in 1978 as a part of a Law Enforcement Assistance Administration-funded Integrated Criminal Apprehension Program. The Lexington department originally requested a low-cost system that would enable a crime analyst to respond to any type of request for information with multiple data elements and logical operands and to have the ability to specify up to 15 user-defined files without need of a programmer. The software was later enhanced and transferred to other sites.

In Sonoma County, once the Series/1, with IBM's EDX operating system, was installed, the IBM Multiple Terminal Manager was set up to control access of three to six terminals to the various programs and indexed files used by the Morgan System. EDX is an operating system unique to the Series/1, and the Multiple Terminal Manager is a direct interface to the CPU.

Each Multiple Terminal Manager can track the I/O requests from various users of the interactive system. The only batch report was a daily dump of the audit trail, which chronicles all data entry, changes, deletes and file access as well as any security violations.

Each user was assigned a password with a security level that enables him to inquire or to inquire and update. Additional passwords permitted file definition and other systems maintenance functions.

Prior to installation, Anderson held discussions with the various users on the types of information they would like to access in the system. Combined with her own requirements, the ana-



NUVEEN'S MAGIC BONDING AGENT

John Nuveen & Company needed something to hold it all together. Again.

The nation's largest investment banking firm specializing in municipal bonds and tax-exempt bond funds was being disrupted by dramatic changes in its business.

Traditionally, a limited number of banks and investment firms had comprised Nuveen's customer base, but starting in 1978 more and more individuals began investing in the bonds and Unit Investment Trusts handled by Nuveen. By early 1982, volume had doubled for the third time in five years and operations were overwhelmed by Nuveen's growth period.

"It was time, once again, for increased capabilities," comments John Claiborne III, Vice President and Manager of Information Services at Nuveen. "Basic Four equipment had come through for us twice before, so we went to them again. What we needed this time was a powerful super-mini that could crunch numbers at remarkable speed, that could handle all types of interactions during the day and batch action at night, and join together all of our terminals and national branch office network.

"It seems that whenever we had a need, MAI had an answer. This time it was their newly developed 8000 series."

Claiborne volunteered to "beta" test the new super-mini in Chicago and within six months, "We had mastered

SPECIAL REPORT

'elementary' for California county sheriff's office

lyst and other department members helped design report forms that would capture data and meet the needs of the department. The files were set up on paper, with notations about length of field, data type, multiple entries per field and interrelationships between the files. The last was important because the Morgan software supports searches of up to five files simultaneously, provided they each contain some common data elements, she said.

After the hardware was set up, the Morgan System was put on-line. Morgan is menu-driven and easy to operate, so data entry people could be trained in about an hour, Anderson said. The first file to contain enough data to be functional was the fingerprint file, and with less than 400 entries, the first burglar was put behind bars. Two months after installation, one burglar was identified by fingerprints and subsequently linked to 25 additional burglaries.

In March 1983, the files began to pay off. A narcotics officer jotted down descriptions of property he saw in a house where he was making a buy. The property came back hot, a search warrant was issued, and a strong case was later built against the suspect. Bonanza time was Christmas 1983, during which $25,000 worth of property was identified after detectives apprehended two burglars with a van full of loot.

Capt. Dale Moore, commander of the department's Field Services Division, called this incident "a marriage of old-fashioned police work coupled with the latest technology."

Paid for itself

In one year, the system paid for itself, in terms of property recovered and returned to crime victims.

McDermott noted, "The computer is a tool, just like a deputy's gun, car, evidence-gathering kit and radio. I encourage all my officers to make use of all the tools available to them to solve crimes and catch crooks."

If Sherlock Holmes worked for the Sonoma County Sheriff's Department now, he would not throw away his magnifying glass, but he would want to make sure he did not forget his password to the computer, either.

the learning curve and optimized the system to fit our needs. It worked like a charm."

Today, Nuveen & Company's farflung and complex activities are tied together by two earlier Basic Four® systems plus two new MAI® 8030s. This high-capability equipment brings multiple advantages to the multiple tasks required by Nuveen:

- Fully configured with three processors, the MAI 8030 can support a large number of users. For Nuveen, the current hookup is 130 terminals with 100 of them on the two 8030s and the remainder on the earlier machines.
- The built-in system arbitrator balances Nuveen's demanding work load among the three processors to enhance the system's productivity.
- The system is hardware independent allowing Nuveen to upgrade hardware or operating system software as technology advances.
- The powerful 32-bit systems provide speed and ease of operation.
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"Handling billions of dollars in investments means handling thousands of transactions," Claiborne concludes, "and the 8030 is up to our needs today and for the foreseeable future."

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Modular system lets manufacturer use only what it needs

WEST LAFAYETTE, Ind. — Bioanalytical Systems (BAS), a developer and international marketer of analytical laboratory instruments, is an aggressive company that stays on top of the state of the art and uses electronics in its products. Likewise, its management recognized early the value of electronics in the firm's own operation for inventory control and bills of materials to organize and control product structures and the items that go into them.

"When we had just a couple of dozen employees, in early 1981, we installed a computer and three modules of an interactive manufacturing control system — sooner in our history than most companies would have,"

IMCS II controls inventory for BAS, a maker of scientific instruments.

Production Manager Don A. Evans explained. "This enabled us to utilize a broad spectrum of features as we grew."

The system, NCR Corp.'s IMCS II, runs on a 320K-byte NCR I-8271 processor, which has 100M bytes of disk storage. Linked to it are four CRT terminals: two in accounting, one in production and one serving both data processing and receiving.

"The manufacturing system helps us maintain a sophisticated level of control on a very large number of products, materials and supply items," explained Director of Strategic Planning Charles R. Stewart. "We have about 2,500 items in our raw material inventory, and one of our lab instruments may require several hundred of these.

"Generally speaking, we can't substitute components as is customary in some other types of manufacturing. So we must have tight, accurate inventory control — and we do," Stewart added.

BAS specializes in instruments used for detection and analysis of trace amounts of organic chemicals. Wedding electrochemistry and liquid chromatography, BAS devices detect chemicals in the picomole range — trillionths of a gram. These minute amounts of organic compounds in biological, environmental and industrial materials can play an important role in maintaining or degrading the health of plants, animals and people.

BAS initially installed just the inventory control and bill of materials modules of IMCS II, followed shortly by an order processing module. The firm then added an accounts receivable system. It has since replaced the order processing module with an integrated general accounting system that includes order entry, accounts receivable, accounts payable, payroll and general ledger.

Long-range plans call for upgrading the computer and installing additional IMCS II modules, including purchasing and receiving, routing, work-in-process, sales analysis, capacity requirements planning, material requirements planning and master production scheduling.

This modular concept lets BAS employ only the applications that best meet its current needs, maximizing its results with minimum investment.

"For example, the inventory module has organized our product structures very well," Evans said. "It enables us to gauge how our inventory is doing — where we may have too much or too little or an improper balance of parts.

"Also, the system allows us to play the 'what-if' game: 'If I want to increase production of a certain product, what will this do to various inventory levels?' " Evans continued. "This is a backdoor approach to material requirements planning, which will do it better when we put that module on, probably in about a year.

"IMCS is a reasonably complete information system, and it's comforting to know that these other modules are there, if and when," he added.

Other benefits Evans cited include the following:

- On ABC analyses for inventory control, IMCS II lets Evans vary parameters, depending on what he is trying to see. This provides him with a way of looking closely at every aspect of his inventory to determine where the dollars are tied up and what can be done about it.
- The transaction register offers the ability to trace any movement of material — by purchase order number, for example — providing an audit trail. BAS uses it for perpetual inventory.
- IMCS II utilizes a common data base, so all transactions are immediately available across the system. For example, when an inventory receipt is entered at one terminal, two seconds later a user at another can see the updated on-hand and on-order quantities.
- Engineering change orders are not too frequent, but when they do occur, the system lets personnel look at on-hand balances, tells them when the stock of an item will be depleted and when it can be replaced with the new item and eases analysis of the purchasing schedule.

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SPECIAL **REPORT**

Amazing sales analysis! Insanely accurate inventory!

Operating system helps N.Y.'s Crazy Eddie manage mushrooming electronics chain

By Sol Rosenberg
Special to CW‡

NEW YORK — In the midst of a quiet evening watching the tube, the near-silence is jarred by a loud interruption. A man in a Santa Claus suit is on the beach, yelling about a Christmas sale in August. The commercial ends with him waving his fists and shouting, "Crazy Eddie — His prices are insane!"

Crazy Eddie is a household name in the metropolitan New York area. His reputation for zaniness has been fostered by insane, loud TV commercials, along with a policy to beat any advertised price on everything in home electronics. These factors have catapulted the Crazy Eddie organization from a one-store start-up operation to a massive, profitable retailer in seven short years.

What has managed this growth? A major factor was a minicomputer. An organization growing at Crazy Eddie's pace must have cohesive information processing capability to manage inventory, accounts receivable, purchasing, point-of-sale — all the supposed trappings of success for 21 stores throughout the New York area.

Crazy Eddie is now in the process of going public. Last year, the company did $107 million in business, yet the total budget for data processing was $55,000, including all hardware maintenance. Crazy Eddie employs a minicomputer running the Interactive Real-Time Information System (Iris) operating system from Point 4 Data Corp. of Irvine, Calif. Rather than employ an expensive in-house staff, Crazy Eddie works closely with the company that helped it computerize.

The Iris operating system is a multiuser, peripheral-independent operating system developed and distributed by Point 4. The software is based on Data General Corp.'s Nova architecture.

Crazy Eddie's software was written and is supported by Mega/Net Corp. of Ramsey, N.J.

The real Crazy Eddie

There really is a Crazy Eddie, although he is not the man on TV. Eddie Antar started his business with a store in Brooklyn, N.Y., where he operated on the philosophy of never letting a customer leave the store without having made a sale. Even if you move the merchandise at cost, you have turned over your money and established good relations with your customer, according to Antar.

One day, a man came in to sell some cooperative radio ads. After the ads ran, the telephone did not stop ringing. Realizing what a key factor advertising could be, Antar then honed his advertising finesse.

Today, he has an in-house production staff, and much of his multimillion dollar advertising budget is paid through cooperative arrangements with vendors. Mega/Net has also developed a system for Crazy Eddie to track all of its advertising, whether in print or on radio or television, for accurate cooperative payments and budgeting.

21 stores

Today, Crazy Eddie has 21 stores, with plans to open five more in the next six months. These include 14 Crazy Eddie stores and seven Disco-Mat retail outlets.

The chain's installation is composed of 40 terminals that are hooked up to the Iris-based minicomputer. Nineteen terminals are located in the two-building main headquarters and in the warehouse, and there is one terminal in each of the 21 stores to handle all the inventory and the point-of-sale functions.

The computer room at Crazy Eddie's

Crazy Eddie uses a comprehensive sales analysis system. The sales analysis is particularly important, as it allows for analysis by salesman, store, time of day, item and other critical information. The inventory system tracks over 120,000 items in inventory for an accurate first in, first out cost. The accounts payable system works with approximately 2,000 vendors, processing 2,000 to 3,000 invoices a month.

The system uses a Bytronix Corp. B5000 CPU and 1M byte of Bytronix Megamite cache memory. There are 19 terminals that are remotely hooked up over 4,800 bit/sec lines. The telecommunications equipment is leased from AT&T.

Rosenberg is the editor of Libra, *a newspaper for Point 4 Data Corp.'s Iris-based computer users.*

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CATV firm switches to mini net to manage growth

DENVER — During the last four years, few American industries have shown the dynamic nationwide growth of CATV. Tele-Communications, Inc. (TCI), a CATV company based here, faces the continuing challenge of allocating financial and human resources for efficient, timely information processing.

Prior to 1981, batch-oriented mainframe data processing was adequate for TCI's information processing needs. Anticipating continuing business expansion, TCI's managers evaluated the available technology to select the best method of handling the increasing information processing load.

TCI network station

Mike Hansen, MIS director, made the decision to replace TCI's existing system, an NCR Corp. 8555 Criterion mainframe.

"We needed on-line, interactive, real-time capabilities," Hansen recalled. "After seven years in the [CATV] industry, I could see phenomenal growth ahead. We needed a flexible relational data base operating system to handle large amounts of data."

After considering several systems, TCI purchased a Prime Computer, Inc. 1000 minicomputer from Information Solutions, Inc. of Englewood, Colo. The system was installed in the first quarter of 1981. Hansen said, "We looked at a lot of computers. Prime offered the largest minicomputer to handle our processing volume, and Prime's Information operating system gave us the relational data base environment and the data base management tools we needed."

As TCI acquired more CATV systems, the company planned a nationwide network of regional offices to manage systems within their respective geographical areas.

Even with effective planning, the conversion from batch to on-line processing dictated increased responsibility for the MIS department. The following is a partial list of what that department faced:

- Selecting terminals and printers for remote sites and assisting with installation and training for this equipment.
- Providing companywide applications, such as interactive word processing and electronic spreadsheet, then providing training and support for the TCI user community.
- Designing and implementing a communications network to support a growing number of interactive users located across the U.S.
- Designing and developing a computer security system for the large number of computer users and the high volume of computer use.
- Incorporating the needs of a Microwave Engineering Development group within the framework of a business-oriented operating environment. Microwave Engineering functions under the Primos operating system, a Prime operating system layered under Information.

CATV, and TCI's role in the industry, continued to expand, creating more demand on information processing capability. The next step was to upgrade and move to the Prime 850 supermini system. Information Solutions provided the 850, along with added disk drives, and the installation went smoothly, Hansen said.

By this time, TCI's regional office network was established, and each of these offices required interactive access to the computer in Denver. The MIS management team installed a Digital Communications Associates, Inc. DCA 355 network processor, running over AT&T Dataphone Digital Service circuits, linking these remote offices to the 850. This network was chosen because it exists in firmware, not in software, and thus is subject to fewer failures.

The TCI system now supports 22 applications operating across TCI's nationwide network. Accounting history is retained for three years, all of which is accessible using Prime Information. The in-house tax application, developed for the CATV industry, processes the complete corporate tax return. TCI's security system regulates and tracks computer access for more than 300 computer users, using 150 terminals and 19 printers across the network. The MIS department now has groups working in research and development, data base management, operations, user support and documentation.

By 1984, TCI had 4,200 employees across the country and generated revenues of $337 million. To keep pace, MIS installed Prime's newest supermini, the 19950, in February 1984. The 19950 currently functions in a configuration with five 300M-byte disks and two 600M-byte disks.

TCI does not restrict interactive access to the system. The 19950 runs interactively 24 hours a day, seven days a week. "We like the minicomputer environment because of its flexibility," Hansen stated, "and we're more productive than we would be in a mainframe operation."

SPECIAL REPORT

System helps credit union save time

SAN FRANCISCO — Converting from an on-line time-sharing system to an in-house computer system resulted in substantial time savings, improved customer service and tightened management control over DP operations for the San Francisco Firemen Credit Union (SFFCU), a 7,900-member institution with $45 million in assets.

Since the credit union is staffed by off-duty fire fighters, none of whom had accumulated any DP experience before the system was installed, the credit union needed a computer system that was easy to learn and operate.

Through a San Francisco-based financial software vendor, Ultradata Corp., the credit union purchased Ultimate Corp. hardware and Ultrafin, Ultradata's specialized financial institution software for credit unions.

The system includes an Ultimate Model 20005 minicomputer and has 512K bytes of memory, a 15K-byte disk drive and controller, a ½-in. self-loading microstreamer tape drive and controller, a high-speed printer, 14 CRT terminals and five 180 char./sec terminal printers for checks and vouchers.

According to Jack Rebholtz, the credit union's acting general manager, the benefits of the in-house system are primarily operational, rather than monetary.

"Costwise, it's hard to compare the two systems," he said. "Before, we had longer hours, little control over the system and less support. Now we have peace of mind plus the opportunity to offer our customers a lot of programs we should have been offering all along."

One of the major benefits of the in-house system is the inclusion of a fully integrated, on-line, real-time general ledger program.

The previous on-line system did not have a general ledger program. Instead, two bookkeepers would spend an entire day entering general ledger information by hand.

Although the Ultimate system cannot totally eliminate human error in the inputting process, the computer can catch all outstanding mistakes at the day's end.

"The old on-line system only provided us with weekly and monthly reports," Rebholtz said. "So, if someone made an error on Monday, we didn't catch it until Friday. Then we had to go back and track down where the mistake was made. And there were times when we were here until 2 a.m. looking for the mistake."

Since Ultrafin does not allow the credit union to run the end-of-day close if any items are out of balance, problems must be resolved the day they are made. If any items are out of balance, the system audits each teller, pinpointing where the error occured.

"Now, it takes us 20 minutes to balance everything and get out of here at the day's end," Rebholtz said.

The system also cut down the time required for preparing daily bank deposits from 1½ hours to two minutes.

Rebholtz said the time saved by the new system has allowed the credit union to expand its customer services by installing automatic teller machines and instituting a share draft program, which is similar to a checking account at a regular bank.

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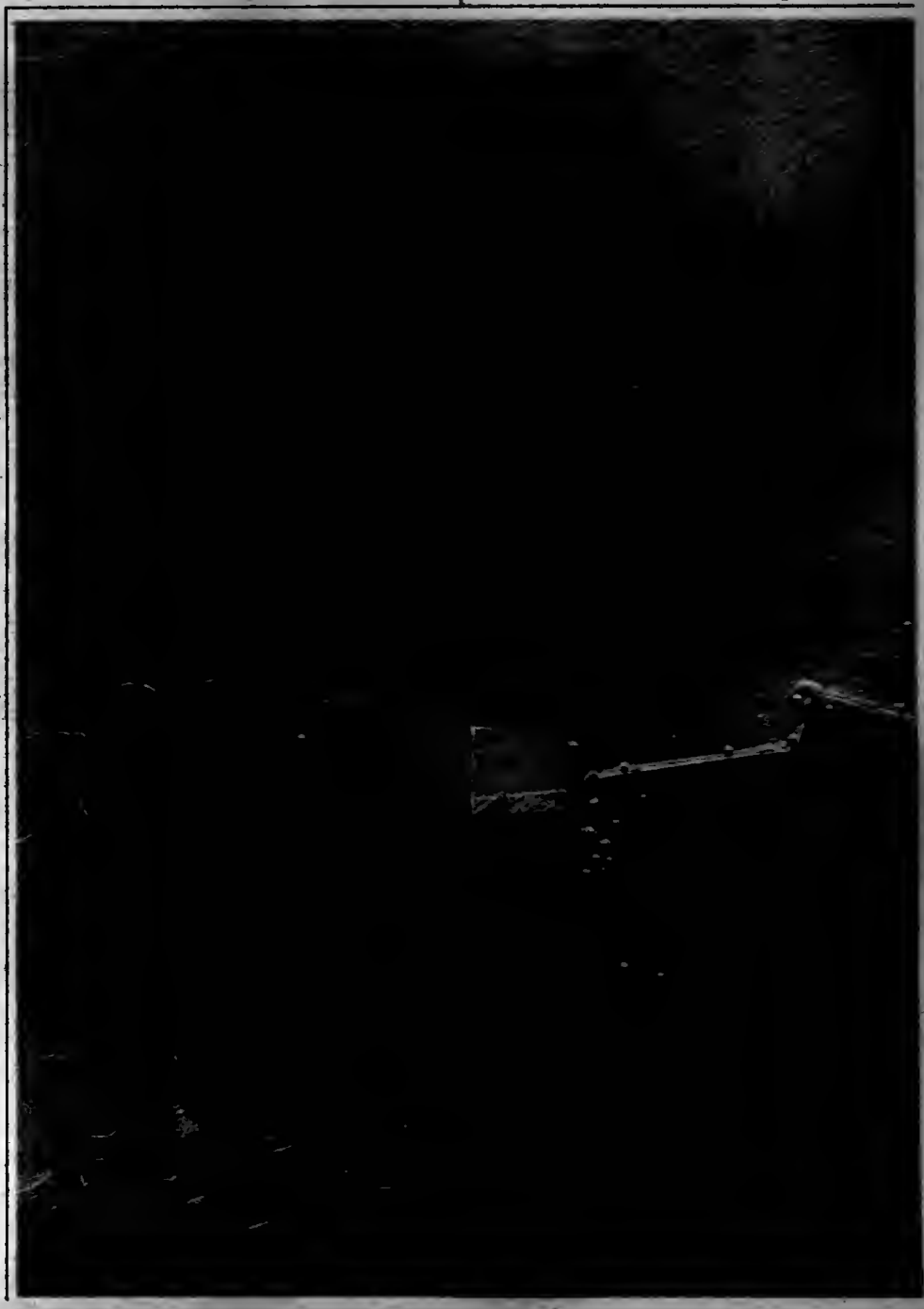


SPECIAL **REPORT**

Minicomputer network propels engine maker's data

STRATFORD, Conn. — Avco Lycoming, a division of Avco Corp. of Greenwich, Conn., is a producer of turbine engines for aircraft, vehicular, marine and industrial uses. Avco Lycoming also manufactures engines for the U.S. Navy/Bell Aerospace Landing Craft Air Cushion, a high-speed amphibious assault hovercraft.

Among Lycoming's accomplishments are the gas-turbine engine for the U.S. Army's Abrams M1 tank, the turbofan engine for the British Aerospace 146 regional airliner and the turboshaft engine for several military helicopters, such as the Boeing Vertol Chinook, the Bell Textron Cobra and the Huey.

The computer network at the Lycoming plant here is hosted by an IBM 3081 system, which is responsible for business, finance and manufacturing systems. Lycoming also relies extensively on a minicomputer network for data acquisition and control systems (Dacs) in order to test all engine products effectively. Each minicomputer system is functionally interfaced to the IBM mainframe for the transmission and storage of all engine test results.

Expansion planned

Currently, 13 Hewlett-Packard Co. HP 1000 systems comprise the Stratford Lycoming minicomputer network. Planned expansion and renovations include the replacement of Digital Equipment Corp. and IBM systems with HP systems and the addition of six HP 1000 minicomputers for additional support of engine and component data acquisition.

The minicomputer systems are connected via an HP Distributed Network System that provides system-to-system communications, resource sharing and remote access. The Distributed Network allows any Dacs system to be accessed from a programmer's workstation.

The minicomputer network supports 55 workstations, which serve a variety of functions. Thirteen workstations are dedicated to software development by the programming staff, while the remaining stations support user applications such as production and developmental engine testing, component testing and laboratory experimentation. The terminals are used by test technicians, mechanical engineers, shop floor personnel, instrumentation engineers and DP personnel.

In addition to the minicomputers, the network supports several microcomputers that are used for calibrating instrumentation and measuring manufactured and purchased parts for product quality assurance. Graphics devices, including CRT terminals and printers, support graphical analysis of test results using in-house-developed software to plot acquired and calculated performance data.

According to Ron Fazzalaro, manager of computer-aided design, manufacturing and test systems, Avco Lycoming has received certain benefits from the network setup. The network provides the capability for centralized software control and verification, allowing usable software to be held only on certain machines. He cited central access for problem diagnosis as being particularly useful during times of trouble.

On a bottom-line basis, the network's capability for resource sharing of peripheral devices, data and systems and application software has proven to be beneficial. Lastly, the system allows Lycoming to isolate the development and maintenance effort and data acquisition functions from testing so that development does not interfere with the real-time work being done.

The Lycoming Dacs system provides continuous monitoring of gas-turbine engines or their components under test and the permanent recording of acquired and calculated engine performance data.

collection efforts during product testing

Test monitoring and recording is achieved through specialized hardware and custom software. Test monitoring includes the acquisition, conversion and display of selected engine parameters and the detection of critical conditions via a computer-controlled alarm system.

Also, test data recording includes acquisition, conversion and output of all defined engine parameters in accordance with specified conversion and performance calculations.

Data is output in the form of reports and is stored on disks for historical record. All data is transferred to the IBM mainframe via remote job entry. This provides a permanent record and permits further analysis of the data by reduction and engine performance programs on the IBM system.

The hardware configuration for an individual Docs includes a test cell that houses the engine during testing. A typical Docs hardware configuration consists of:

- A minicomputer with a hard disk drive.
- A special-function keyboard for operator input.
- A special display CRT terminal for test monitoring.
- An input terminal for test initialization and display of engine data.
- Data acquisition devices such as multiplexers and analog hardware.

Software is the vital link between the engine, the instrumentation and the Docs. The frequency of specification revisions and the introduction of new technology require that flexibility as well as complexity be built into the software, which is developed entirely at Stratford Lycoming.

Test cell with engine being prepared for a test

Software functions

Some of the software functions include:

- Monitoring of test parameters, which include fluid flow, rotational speeds, temperatures, positions, vibrations and pressures.
- Calibration of data acquisition instrumentation.
- Initialization according to engine model and type of test.
- Data acquisition with a scan rate up to 10,000 data points per second.
- Conversion of raw data to engineering units.
- Engine performance calculations.
- Automatic data transmission to the mainframe.

Specialized software

Several specialized software systems have been developed at Lycoming to support the testing that is required for engine certification.

The Programmed Test Cycles use the data acquisition function and provide a step-by-step instruction mode for the test cell operator.

The Closed Loop system provides the capabilities of Programmed Test Cycles and sets engine operation under computer control, thereby eliminating the need for operator intervention.

The Transient Acquisition System records engine parameters at very high speed to allow examination of rapidly changing engine conditions that are of too short duration to be detected normally.

A working blend

Avco Lycoming has defined and implemented a working blend of minicomputers and mainframe processing.

The nature of turbine engine testing requirements is such that the speed, response and availability of specialized minicomputers is required.

Avco will continue to expand its distributed minicomputer network as technology and business needs dictate.

SPECIAL **REPORT**

Net helps Colo. agency keep up with population boom

DENVER — Colorado's healthy economy and population growth can be attributed to its abundance of energy and mineral resources, open spaces for agriculture and commercial land development and the awesome beauty of the Rocky Mountains that attract tourists throughout the year.

The result of this combination was a migration to the state of more than 350,000 people in the last decade. More people brought more prosperity — as well as an increased demand for services from state, county and city agencies.

One state agency, the Motor Vehicles Division (MVD) of the Colorado Department of Revenue, has equipped each of its local offices with the ability to respond to the needs of a growing population in a fast and efficient way. The MVD recently awarded Mohawk Data Sciences Corp. (MDS) of Parsippany, N.J., a $3.2 million contract for a distributed data processing network to connect Colorado's expanding motor vehicle registration and titling activities in a statewide network.

The MVD's setup consists of more than 200 MDS Hero networked personal computers, located in 70 offices and operated by county clerks who act as agents for the MVD. Each system has its own data base and personal computing capabilities and permits file sharing between the statewide locations and the central MVD site in Denver.

Motor vehicle titling and registration, which was previously handled manually and took three to six weeks to complete, now takes minutes to produce. The procedure includes recording vehicle identification numbers and title data, calculating various classes of fees and taxes and printing receipts, registrations and reports.

Depending on their needs, county offices throughout the state will have systems that include either standalone individual Heros or clusters of up to 13 units. Each Hero provides from 256K bytes to 1M byte of memory and 10M bytes to 60M bytes of disk storage. A combination of character printers and high-speed line printers (300 line/min to 1,000 line/min) will produce registrations, receipts, reports, general correspondence and listings.

"County officials and our staff are very enthusiastic about the capabilities of the MDS equipment," stated Frank Mansheim, director of the Motor Vehicles Division. "It's a flexible, reliable and expandable network that we believe provides the most advanced technical capabilities available. It will significantly enhance our ability to serve the citizens of Colorado and greatly enhance our administrative processing ability."

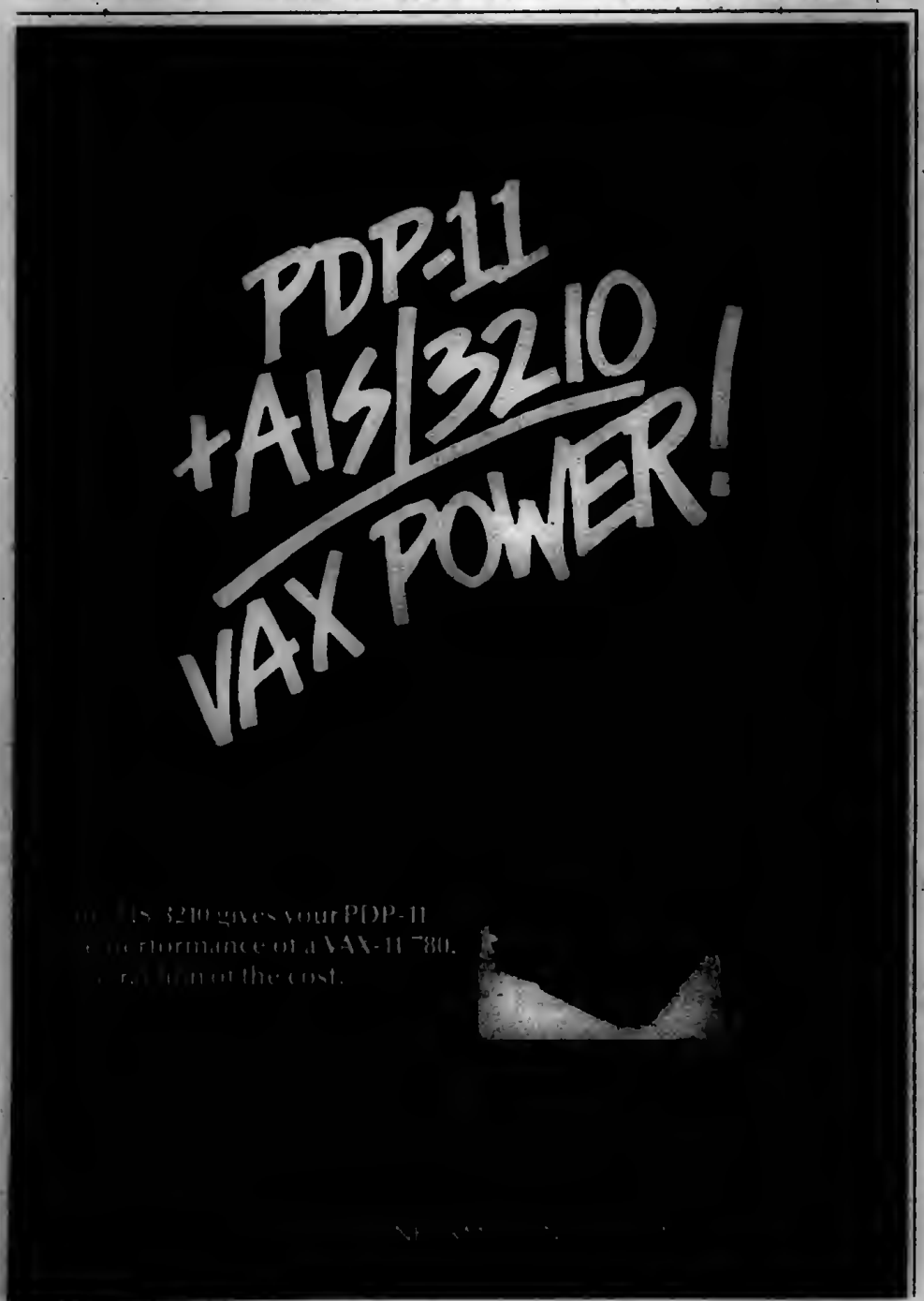
Network planning

In planning the network several years ago, Colorado state officials published basic network requirements that all vendors, including MDS, had to address in their bids.

Included on the list of priorities were terminals that were compatible with existing communications protocols, such as IBM Binary Synchronous Communications 3270 with the capability to upgrade to Systems Network Architecture/Synchronous Data Link Control communications.

Although the network was based on current MVD requirements, state planners looked for equipment capable of growing beyond immediate needs. They wanted a multifunctional system that provided word processing, financial analysis and customized programming in addition to basic MVD functions.

"The Hero was chosen for a lot of reasons, but one of the most important was its potential for expansion," Mansheim said. "The MVD is giving the counties the opportunity to use MDS Heros for other purposes, as long as the applications don't interfere with MVD business."



SPECIAL REPORT

Hierarchical computing will save the mini from untimely demise

By Richard K. Fox
Special to CW‡

Much has been written concerning the demise of the minicomputer. Pressured at the upper end of the performance scale by downsided mainframes and at the lower end by 16- and 32-bit micro systems, the general consensus seems to be that the minicomputer is, in fact, a dying breed. A corollary to this conventional wisdom is that any company dependent on the minicomputer for survival will also not be around too much longer.

If we look at this idea in a a historical perspective, things may seem a bit different. When the first minicomputers were produced, many industry pundits quickly prophesized the end of the mainframe. If a quick look at IBM's production of 3080 series computers is any indication, the demand for large mainframe computers has not slowed at all. The demand has actually increased significantly over the last 10 years. At the same time, demand for minicomputers of all types has also increased.

What is the explanation for this phenomenon? As the cost of a certain level of computer power drops to a given level, this computing powsr becomes attractive to many more applications.

As the price/performance curve flattens, demand for each type of machine will increase proportionally. Today's minicomputer performance will be available in tomorrow's micro aystems. However, the organization currently using today's minicomputer will demand still greater performance in the future. If hardware advances continue to be made (and there is no reason to suppose they will not), today's mainframe performance will be available in a box very much like today's minicomputer in size and environmental requirements.

The answer to the original question concerning the future of the minicomputer then becomes an easy one to answer. The minicomputer in its present hardware and software forms will disappear and, indeed, has already started to do so.

The industry niche currently occupied by the minicomputer will not disappear — just the opposite. As this level of computing capability becomes available in a cheaper and easier-to-operate form, demand will increase substantially.

In the not very distant future — one to three years — a hierarchy of computing power will be available to corporations of all sizes. Rudimentary efforts may be seen in this area with the development of local-area networks and the related micro-to-mainframe connectivity products. Software control must still be developed to be very user-friendly and to allow processing of jobs at various levels of the information processing hierarchy, depending on the users' requirements.

This ability will not be easily developed or available overnight, of course; there will be many false starts and mistakes made. However, the potential for a hierarchical corporate information utility is certainly within the realm of possibility.

The availability of a wide range of processors within the hierarchy means that we will have some that look and act much like today's minicomputers, others looking like today's micros and still others like today's mainframes and supercomputers.

Concepts and definitions will change and merge as hardware and software advances appear and are just as quickly superceded. Only those professionals able to understand the capabilities of this new technology and to relate the improved price/performance to the demands of the new information age will prosper and provide their organizations with effective information resource management tools.

Fox is data center manager for American Life Insurance Co. in Wilmington, Del.

SPECIAL **REPORT**

Modular systems will replace minis; mid-range computing will endure

By Sandra Metz
Special to CW‡

Many people are wondering what the fate of minicomputers will be.

While the terminology used to define computer size and power is in a constant state of flux, there is a growing need for computers of all kinds, in a variety of price, power and size ranges. The term minicomputer may be in danger of extinction, but mid-range computers will not share that fate.

The implementation of a concept known as modular expandability makes the different terms almost superfluous. A modularly expandable system can have additional computing power added to it without requiring reprogramming.

Such a system allows a company to start with a system that meets current and near future needs and expand that system to mirror the growth of actual processing requirements.

Many computer vendors provide upgrade paths so a customer can migrate applications to more powerful systems when the need arises. This approach requires that upgrades be accomplished through system replacement, involving the purchase of a new system and disposal of the old system.

With a modularly expandable system, upgrading is a matter of addition, rather than replacement.

Upgrading through replacement has another drawback besides cost: incompatibility. Even though some vendors call a group of systems a family, the different machines are rarely compatible at the system code level. The bottom line is that systems programmers will have to be retrained for the new machine, and some reprogramming may be required.

The key to a modularly expandable system is that all programs will continue to run without modification after the upgrade.

There are several ways to achieve modular expandability in a computer system. Each provides different features.

Many modularly expandable systems contain multiple processors, but only one main memory, which is shared between them. This design allows additional processors to share further the existing system memory. The problem with these systems has been that the computing power has not grown at the same rate as the additional investment in processors. Applying more processors against the same memory often causes a contention problem for memory access.

Another method of achieving modular expandability is by using a local-area network approach. With this method, the additional processing power comes from additional computer systems, each with its own memory. The systems are connected through a controller that provides an interface between the processors. Such a configuration is most efficient when the majority of the computing activity takes place within one system.

A third approach

Another approach to modular expandability, one that provides a linear increase in computing power for a given investment without communications bottlenecks, is a multicomputer architecture that consists of multiple processor modules, each with its own memory, I/O interface and power supply, connected via a high-speed, dual-interprocessor bus system.

There are no contention problems associated with this architecture because each processor module has its own memory and I/O, but can still access other processor module resources via the dual buses.

Expanding this system is a matter of adding additional processor modules. No reprogramming is required.

Metz is a technical public relations writer with Tandem Computers, Inc., a Cupertino, Calif., manufacturer of minicomputer systems.

Your IBM 34/36/38 Will Think This Is A $17,000 Printer.

For all your IBM 34, 36 or 38 knows, your new Datasouth TX-5180 is an IBM 5225—an overpriced, underfeatured copy cruncher the size of a washing machine. It might even think your Datasouth is an IBM 5224 or a 5256, both of which are just as clunky and cost upwards of $4500.

But you know better. You know your TX-5180 is a perfect 34/36/38 dot matrix printer that costs a fraction of what IBM wants you to pay for one of their printers. You also know your TX-5180 even beats its third-party black box competitors. Because it doesn't come with a black box. Or dipswitches. Or any of the other old-fashioned inconveniences that clutter most of the printers in the 34/36/38 market. Instead it comes with a list of features that make you as happy as your accountant.

Like parallel and IBM twin-ax interfaces (so you can hook up your TX-5180 to a PC as well as your IBM 34/36/38). Cable-through and terminate capability. Bidirectional printing at 180 cps. Six different character pitch settings. The most complete, friendly and ergonomic front panel controls in its class. And legendary Datasouth reliability.

So treat your computer and your accountant to the best printer a little money can buy: your new Datasouth TX-5180. It's only a toll-free call away. Make that call today.

Your Accountant Will Think It's A Miracle.

AUDITOR'S REPORT

We have examined the Datasouth TX-5180 and found its features and characteristics exceed accepted expectations for IBM 34/36/38 printers. A partial list follows.

- ☐ Tabletop, impact matrix serial printer
- ☐ 180 cps bidirectional printing
- ☐ Tractor feed forms: 3"-15"
- ☐ Cartridge ribbon
- ☐ Cable-thru and terminate
- ☐ Push button programming
- ☐ Twin-ax and parallel (ASCII) interfaces

The TX-5180's ratio of value to price is exceptional. Purchase of the device is highly recommended.

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MICROCOMPUTERS

Personal Computer AT: Where's the software?

By Paul Korzeniowski
CW Staff

While industry analysts generally gave good reviews to the new IBM Personal Computer AT's hardware, they noted that almost no Microsoft Corp. Xenix applications are available, while existing IBM PC-DOS packages do not take full advantage of the new machine. They also suggested that Big Blue may unveil a proprietary operating system for the new machine and added that IBM is expanding efforts to market its own personal computer software.

"Where's the beef — the software for the [Personal Computer AT?]" asked John Dunham, managing analyst at Gnostic Concepts, Inc. "There wasn't much software announced that takes advantage of the hardware. I also question what users could possibly do with 3M bytes of storage."

Analysts offered a wide range of theories on how the storage space could be used. "There is an advertisement for a micro data base management program that claims to support 2 billion records," noted Naomi Karten, president of Karten Associates, a Randolph, Mass., consulting firm. "In tiny letters is a disclaimer which states: 'Depending on hardware capabilities.' Now there is hardware capable of working with a data base that large."

Karten added that downloading mainframe information may be easier, since users have sufficient memory to store information.

The Personal Computer AT could function as a computer-aided design or computer-aided manufacturing system, according to Jim Renalds, analyst at Dataquest, Inc. "Complex laboratory experiments or complicated corporate analyses require a large amount of memory," he said.

Analysts noted that a chief limitation to productive use of the Personal Computer AT's vast storage lies in the PC-DOS operating system. "PC-DOS cannot adequately manage more than 640K bytes of memory," stated Laura Stuart, senior analyst at the Yankee Group in Boston.

Stuart believes that IBM "deliberately crippled" Microsoft's Xenix so that Xenix would not emerge as a viable alternative to PC-DOS. "Xenix can currently support 16 users, but the [Personal Computer] AT can only support three," she said. "IBM also decided not to support Xenix on IBM's PC Network."

She hypothesized that IBM intended to announce a proprietary operating system to manage the Personal Computer AT's vast internal memory adequately. "IBM's Entry Systems Division was so eager to announce the product that [the product] was delivered without its proprietary dressing," Stuart suggested.

The analyst predicted that in the fall IBM will announce a Personal Computer AT version of its VM operating system, and Microsoft will produce an enhanced version of PC-DOS. "Xenix will be pressured from the top with IBM's VM operating system and from below with a mul-

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■ IBM announces service for non-IBM equipment/62

■ Computer Information Enterprises, Inc.'s Hummingbird allows IBM Personal Computer to run Series/1 software/62

INSIDE

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Systems/66

Corona joins IBM-compatible multiuser micro arena

By Kathleen Sullivan
CW West Coast Bureau

THOUSAND OAKS, Calif. — Corona Data Systems, Inc., maker of IBM-compatible personal computers, this month threw its hat into the multiuser microcomputer ring by announcing the Corona Mega PC, an IBM-compatible multiprocessor system.

The Mega PC features a "network-in-a-box" design and supports up to eight users, according to Robert S. Harp, chairman and chief executive officer of the firm. At the heart of the system is a central system unit, which includes the microprocessor boards, random-access memory (RAM), all mass storage devices and printer and modem connectors. Single-user workstations are connected to the Mega PC by coaxial cable.

Corona's Mega PC, which includes Microsoft Corp.'s MS-DOS operating system (Version 2.0), will run application programs designed for the IBM Personal Computer, the company said. Although the current version of MS-DOS does not offer record and file locking, half-a-dozen software vendors will offer record and file locking with their business software programs for the Mega PC, a company spokesman said.

The Mega PC reportedly operates in two modes. In one mode, each terminal can function in the same way as a stand-alone IBM Personal Computer XT. A second multifunction, multiterminal mode permits users to share data bases, Corona said. The Mega PC can handle any combination of the two modes with password and read/write protection, while permitting users to share hard-disk resources. Up to eight users can operate in the same or different modes concurrently, the company said.

The central system unit of the Mega PC includes a main file server board that incorporates an Intel Corp. 8088 microprocessor and 256K bytes of RAM, which can be expanded to 512K bytes. This master processor is dedicated to performing all the system housekeeping and overhead work.

The central system unit also includes an additional board containing 11 IBM Personal Computer-compatible bus expansion slots. Up to eight slots can be used for Application Processor Cards (APC), each dedicated to a single user and incorporating an

See CORONA page 66

Trend: Rumors masquerading as facts

SMALL TALK
Paul Korzeniowski
CW Staff

The rumor mill was whirling feverishly over the last few weeks as IBM prepared for the Aug. 14 Personal Computer AT announcements. Throughout the summer, stories in the trade press listed incorrect days for the product's announcement and promised exclusive looks at IBM's latest personal computer.

■ The Personal Computer AT would feature dual Intel Corp. 80286/8086 microprocessors, according to one publication.

■ Another report stated that IBM's long-awaited multiuser PC-DOS operating system would be unveiled.

■ IBM would also introduce a lap-size IBM Personal Computer and use 3½-in. disk drives on both machines, according to one story.

■ Another piece stated that the system would have only a 10M-byte hard disk.

Hidden in this fiction and gossip were kernels of accurate information. Important information such as the Personal Computer AT's ability to act as either a single-user or a multiuser computer, the introduction of the first microcomputer package developed solely by IBM and the launch of the IBM PC Network was generally missing. Unfortunately, separating accurate information from fiction was a chore that only Big Blue could do, and it was not talking.

Sources were talking, for talking is what they do best. These mystery guests tend to be industry mavens who wish to endear themselves to a publication, placate an insatiable ego or both. One way to accomplish this is to give a publication a hot story. In return, the publication will quote the maven (in those safe cases where he can be quoted), and his business may improve.

See RUMORS page 72

Micro software: Traits of the next generation

By Robert Glickrist
Special to CW‡

Part two of a two-part series on the current limitations and possible enhancements to personal computer software.

Last week, I discussed some of the current limitations of microcomputer software and proposed a data-base-oriented system as a solution to those problems. This week, I will take a closer look at that software.

First, the software must be able to accommodate interruptions, because they are the normal part of a worker's day. Task switching must be at least as fast as it would be with paper. Most software limits the user to one program at one time. If a user is updating invoices and wants to make an ad hoc change to a corresponding project schedule record, he must either switch floppies or input a complex command string. Most users neglect to make the change immediately, and the update happens later by hand or not at all. To induce a user to make the change immediately, software must allow the user to change tasks by striking three or four keys and entering English-like commands.

While it is essential that the new software be data-base-cen-

See TRAITS page 66

Glickrist is chairman of Dayflo, Inc., an Irvine, Calif., microcomputer software vendor.

Hummingbird lets IBM micros run Series/1 tools

TUSTIN, Calif. — An operating system for the IBM Personal Computer and Personal Computer XT that reportedly permits those machines to run software written for the IBM Series/1 and to operate in a multitasking mode has been announced by Computer Information Enterprises, Inc.

The operating system, called Hummingbird, is currently in production testing and will be available in the third quarter of this year, according to Computer Information. Hummingbird reportedly handles asynchronous communications with other devices, including Series/1 machines. The program allows the downloading of the Series/1's EDX operating system's object program without a need to recompile and permits the Personal Computer to run Microsoft Corp. MS-DOS software, though not concurrently with Series/1 software, according to the vendor.

"Right now, if you have a Series/1, you have nowhere to go," claimed Computer Information President Gary Irwin. "We have allowed EDL [the Personal Computer version of EDX] object programs to go with the [Personal Computer] with no programming changes."

Calling his firm's product a bridge between the Series/1 and the Personal Computer, Irwin said that the Series/1 software could also be transferred to diskettes and from there to Personal Computers.

He added that the Series/1 packages running on the Personal Computer under Hummingbird have approximately the same performance levels as the software running on a Series/1 Model 4964.

Hummingbird will be priced at $500 and will require a Personal Computer with a minimum of 128K bytes of memory.

Computer Information Enterprises is located at Suite B, 2685 Dow, Tustin, Calif. 92680.

SOFTWARE

PASCACK DATA SERVICES, INC.
Multiplan Interface

Pascack Data Services, Inc. has introduced an interface to Microsoft Corp.'s Multiplan spreadsheet. Multiplan Interface runs on the Burroughs Corp. B20 and on Convergent Technologies, Inc. computers under the Ctos operating system.

Multiplan Interface reportedly allows users to convert any data file into a format compatible with Multiplan. It reportedly can store multiple user file definitions and allow those definitions to refer to all or selected files. Multiplan Interface's spreadsheet specification selection/generation capability allows the specification file to be stored for repeated use or modification, according to the vendor.

Multiplan Interface is priced at $600.

Pascack Data Services, One Kahles Way, Paramus, N.J. 07652.

See SOFT page 83

IBM to service non-IBM Personal Computer aids

WHITE PLAINS, N.Y. — Several non-IBM products that IBM is selling for its Personal Computer will be maintained by IBM under a recently announced program.

The service, primarily for printers and circuit boards, will be provided through IBM's nationwide network of service and exchange centers, IBM said.

Products to be supported under the service program are the Irma communications board from Digital Communications Associates, Inc.; six boards from AST Research, Inc.; Okidata Corp.'s ML-93 printer; and Epson America, Inc.'s FX-100 printer, according to the company.

Among the types of service offerings that will be available are on-site exchange by either IBM or the customer and customer carry-in exchange or repair. IBM will not provide warranty service, but will provide service during the warranty period to customers that wish it, the company said.

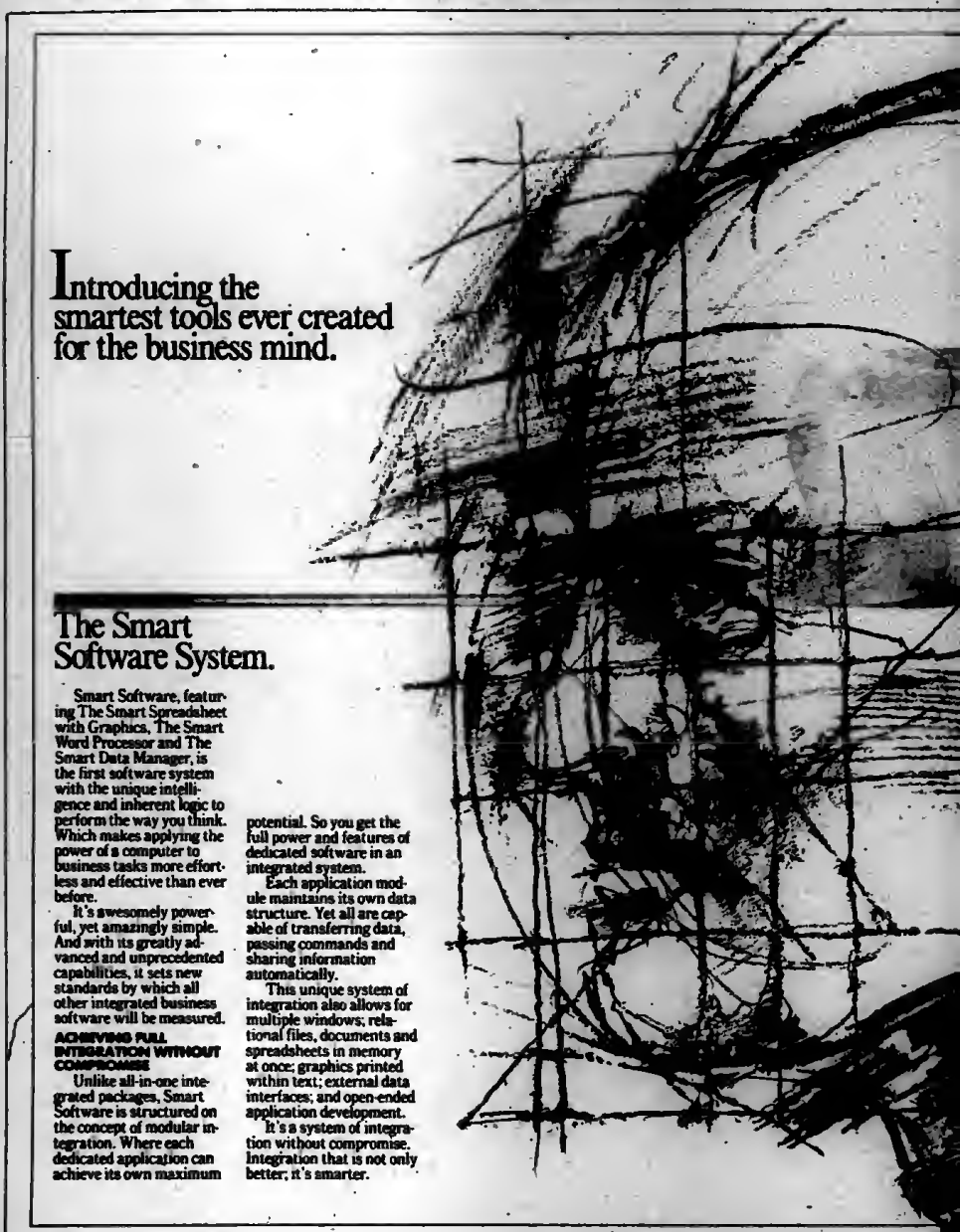
Feature cards

Feature cards receiving service support from IBM will be available for IBM on-site repair or customer carry-in repair only. Supported feature cards can only receive service if they are part of an IBM maintenance agreement on an IBM Personal Computer, according to the company.

Requests for service can be made through IBM's national toll-free number. Callers will be asked to provide the machine's type, serial or repair identification numbers and told how to proceed according to the service offering they have previously selected.

Service charges for the IBM-compatible Epson FX-100 printer, for example, are: IBM on-site exchange, $140; customer on-site exchange, $110; customer carry-in exchange, $85; and customer carry-in repair, $85.

Additional information is available from IBM, Information Systems Group, National Accounts Division, 1133 Westchester Ave., White Plains, N.Y. 10604.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It's a system of integration without compromise. Integration that is not only better; it's smarter.

SOFT from page 62

MEDIA CYBERNETICS, INC.
Dr. Halo

An image creator and picture editor designed for the IBM Personal Computer and compatible systems has been introduced by Media Cybernetics, Inc.

The Dr. Halo icon-oriented software package reportedly lets users specify system commands and attribute menus without the use of a keyboard. The package is said to have more than 150 graphics functions. Dr. Halo is said to exceed Apple Computer, Inc.'s Macpaint graphics capabilities, displaying graphics in high-resolution monochrome and color.

The product is reportedly compatible with a number of micros, including IBM's PCjr, Compaq Computer Corp.'s Compaq and Texas Instruments, Inc.'s Personal Computer. Among the graphics boards that can be used with Dr. Halo are those manufactured by Tecmar, Inc., AST Research, Inc., Orchid Technology, Inc. and Scion Corp., the company said.

The price of Dr. Halo is $99.95, plus shipping and handling costs.

Media Cybernetics, 7048 Carroll Ave., Takoma Park, Md. 20912.

POLYGON ASSOCIATES, INC.
Poly-Regis software

Polygon Associates, Inc. has introduced Poly-Regis graphics software for use with Digital Equipment Corp. Rainbow microcomputers with 128K bytes of memory and graphics options. The software permits execution of the Regis graphics commands of the DEC VT125 and VT240 terminals, Polygon said.

The software reportedly allows users to run such programs as Isoco, Inc.'s Disspla and Telegraph and SAS Institute, Inc.'s Saxgraph. It is also said to permit Regis commands entered from the keyboard to be executed. Poly-Regis, reportedly a resident extension to the Digital Research, Inc. CP/M and Microsoft Corp. MS-DOS operating systems, does not provide terminal emulation.

Poly-Regis is priced at $185.

Polygon Associates, 1034 Executive Pkwy., St. Louis, Mo. 63141.

PERSONAL COMPUTER MANAGEMENT, INC.
1-2-3 to Framework

Personal Computer Management, Inc. has announced 1-2-3 to Framework, an interactive training tool that runs on the IBM Personal Computer.

The computer-based training course, which can be completed in 90 minutes, teaches a Lotus Development Corp. 1-2-3 user the basic commands of Ashton-Tate's Framework, according to the vendor. The product features practical simulations that allow the user to create common applications for the program, Personal Computer Management said.

Courseware includes a program diskette, reference text material and a pocket-size reference card of key procedure comparisons.

1-2-3 to Framework costs $79.95.

Personal Computer Management, 1626 Orth Drive, Wheaton, Ill. 60187.

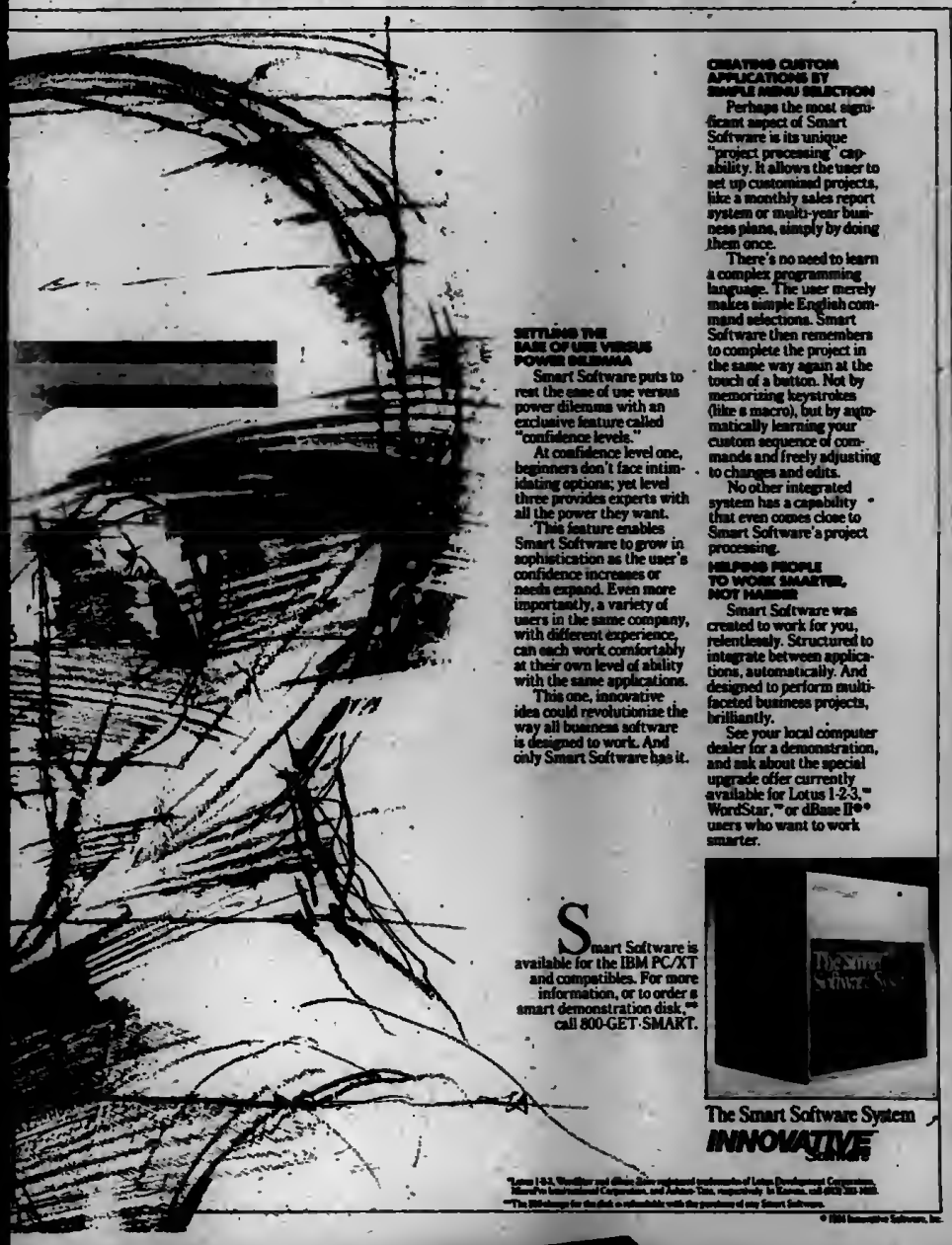
EPSON AMERICA, INC.
Softstyle

Epson America, Inc. has announced Softstyle, a print driver program that allows Apple Computer, Inc.'s Macintosh programs to use Epson's FX-80 printer.

To allow a package to drive the FX-80, the user inserts the Softstyle diskette and follows menu-driven commands, Epson said. The process reportedly does not have to be repeated each time the Epson printer is used. If a user wishes to use the original printer, he can insert Softstyle, execute a few commands and use the FX-80, Epson said.

Epson's FX-80 printer reportedly features a printer speed of 160 char./sec, an 80-col format, a 2K-byte buff-

Continued on page 64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Smart Software puts to rest the ease of use versus power dilemma with an exclusive feature called "confidence levels."
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MICROCOMPUTERS

Continued from page 63

er and full descenders.

Softstyle costs $29.95 and requires a connecting cord and a serial interface card.

Epson America, 3415 Kashiwa St., Torrance, Calif. 90505.

RIO GRANDE SOFTWARE, INC.
Textpro

Rio Grande Software, Inc. recently announced Textpro, a series of 10 text editing software programs designed to help check written documents.

Textpro reportedly enables writers and nonprofessionals to index work, create new dictionaries, check for spelling errors, make lists and add lists together.

Textpro reportedly operates on the IBM Personal Computer and compatible systems. It works with Micropro International Corp.'s Wordstar, Microsoft Corp.'s Microsoft Word, Sorcim/Information Unlimited Software, Inc.'s Easywriter and any word processor that outputs Ascii text, the vendor said. The package comes with a standard 20,000-word dictionary.

The package sells for $199.

Rio Grande Software, 1107 Upas, McAllen, Texas 78501.

MCDONNELL DOUGLAS AUTOMATION CO.
DFD Draw

McDonnell Douglas Automation Co. has introduced DFD Draw, a software package for drawing data flow diagrams using the IBM Personal Computer.

DFD Draw reportedly contains a template of all graphics symbols needed for interactive-flow diagram production. The symbols can be called up on a monitor, positioned, connected and annotated with text under user control, according to the vendor. Data flow diagram dimensions reportedly can be quickly enlarged or reduced through scaling and size functions. Pan and zoom features are provided for editing, the vendor said.

DFD Draw requires a Personal Computer with at least 256K bytes of memory, an IBM color monitor and a color graphics monitor adapter.

DFD Draw is priced at $500.

McDonnell Douglas Automation, P.O. Box 516, St. Louis, Mo. 63166.

CENTRAL POINT SOFTWARE, INC.
Mactools

Central Point Software, Inc. has introduced Mactools, software that reportedly integrates several of the standard disk functions of the Apple Computer, Inc. Macintosh into one program.

Mactools also reportedly offers the ability to verify a disk, copy protect and unprotect, lock and unlock files and make files visible and invisible to users. It also offers such disk manipulations as copying files, renaming files and deleting files, according to Central Point.

Mactools also is said to offer a pattern-matching function that allows users to choose to copy everything that begins with a certain word in a file or only those files that contain a certain word.

Mactools is priced at $39.95.

Central Point Software, Suite 100, 9700 S.W. Capitol Highway, Portland, Ore. 97219.

BELLESOFT, INC.
Entry System for Programs

Bellesoft, Inc. has announced a language-oriented editor for IBM Personal Com-

Continued on page 66

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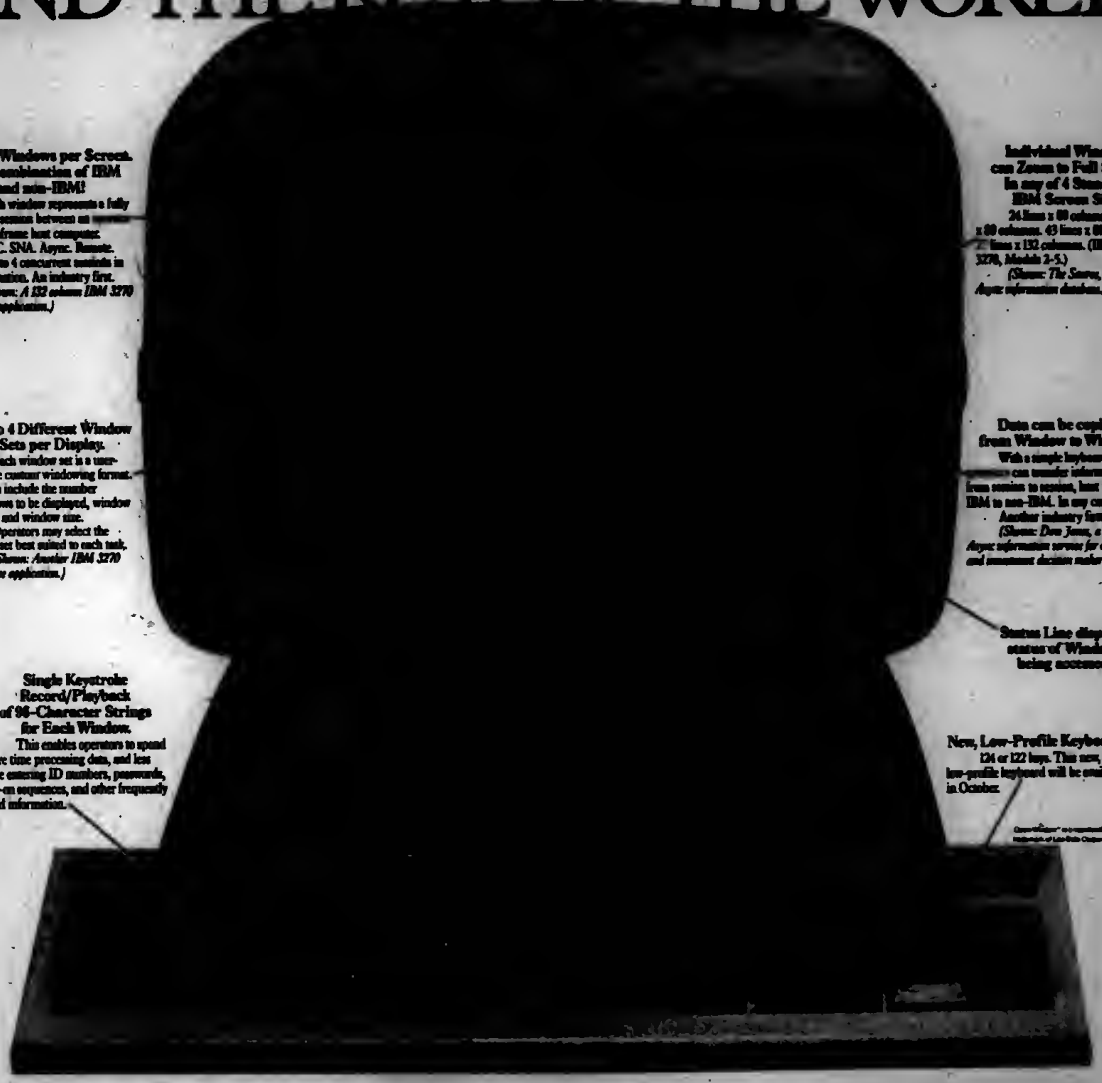

Up to 4 Windows per Screen. Any Combination of IBM and non-IBM!
Each window represents a fully interactive session between an operator and a mainframe host computer. BSC. SNA. Async. Remote. Local. Up to 4 concurrent sessions in any combination. An industry first. *(Shown: A 132 column IBM 3270 interactive application.)*

Up to 4 Different Window Sets per Display.
Each window set is a user-definable custom windowing format. Variables include the number of windows to be displayed, window location, and window size. Operators may select the window set best suited to each task. *(Shown: Another IBM 3270 interactive application.)*

Single Keystroke Record/Playback of 96-Character Strings for Each Window.
This enables operators to spend more time processing data, and less time entering ID numbers, passwords, log-on sequences, and other frequently used information.

Individual Windows can Zoom to Full Screen.
In any of 4 Standard IBM Screen Sizes. 24 lines x 80 columns. 32 lines x 80 columns. 43 lines x 80 columns. 27 lines x 132 columns. (IBM 3180/3270, Models 2-5.) *(Shown: The Source, a remote Async information database.)*

Data can be copied from Window to Window.
With a single keyboard sequence, operators can transfer information from session to session, host to host, IBM to non-IBM. In any combination. Another industry first. *(Shown: Dow Jones, a remote Async information service for executive and investment decision makers.)*

Status Line displays status of Window being accessed.

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Continued from page 64

puter Pascal and C language users.

The Entry System for Programs (ESP) is said to enable novice programmers to learn Pascal and C languages more quickly and to help experienced programmers work more efficiently.

ESP is based on a text editor, with features said to include direct cursor, range, page and file positioning; and scrolling, insertion, deletion, joining and overwriting capabilities. With split-screen editing, the user can view, edit and save up to five windows of text at once, the vendor said.

ESP is said to give the user access to Pascal and C program formats. It builds Pascal or C program structures, and the user completes program statements with the available options, the vendor said.

The editor is available for the IBM Personal Computer, Personal Computer XT, compatibles and other computers operating under Microsoft Corp.'s MS-DOS operating system with at least 192K bytes of random-access memory, a disk drive and an 80-col. display. Users must supply their own Pascal or C compilers, the vendor said.

ESP is priced at $249 for Pascal, $349 for C and $399 for Pascal and C.

Bellesoft, 2820 Northrup Way, Bellevue, Wash. 98004.

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CANNED KNOWLEDGE CORP.
Zipcode

Canned Knowledge Corp. has announced a business application development tool that runs on Microsoft Corp.'s Xenix and MS-DOS, IBM's PC-DOS and the Unix operating system. Zipcode uses a fill-in-the-blanks procedure for definition of a user's requirements and then creates Cobol source code to meet the user's specifications, according to the vendor.

Zipcode also creates a user's guide, providing instructions to run the programs it wrote, the vendor said. The Cobol source code is available for modification and/or compilation. Zipcode includes a program generator, a Cobol source code editor and tools to assist the programmer or nonprogrammer in the development of software.

The price of Zipcode is $995.

Canned Knowledge, Box 37, Rt. 1, Pineville, Mo. 64856.

ON-LINE BUSINESS SYSTEMS, INC.
Wylbur/PC 2.0

On-Line Business Systems, Inc. has enhanced Wylbur/PC, a software tool kit that runs on the IBM Personal Computer.

Enhancements include Quik files, which allow simultaneous access to multiple sequential files, support for more than 200 open random files and IBM PC-DOS 2.0 subdirectory support, On-Line Business Systems said. The product reportedly gives error-free file transfers, Exec programming language enhancements and improved report writing capabilities.

Wylbur/PC has been used to develop applications such as front-end display menus and automated source code conversions, according to the vendor.

Wylbur/PC costs $550, and a demonstration disk is available for $10.

On-line Business Systems, 115 Sansome St., San Francisco, Calif. 94104.

MANAGEMENT ANALYTIC SUPPORT, INC.
Mascope 3.0

Management Analytic Support, Inc. has introduced Release 3.0 of its Mascope linear and integer programming package for the IBM Personal Computer XT.

Mascope Release 3.0 reportedly offers a 30% to 40% improvement in solution speed for integer problems and can track integer solutions as they evolve. It is said to be menu-driven, to use English commands and to allow problems to be entered, saved and recalled without using other software or editors.

Mascope is priced at $285 for a version with 50 constraints by 100 variables. A version with 100 constraints by 200 variables is priced at $365, and a version of 150 constraints by 300 variables is priced at $475.

Management Analytic Support, 6826 Dean Drive, McLean, Va. 22101.

SYSTEMS

POLO MICROSYSTEMS, INC.
Ramjet PC

Polo Microsystems, Inc. has introduced its Ramjet PC personal computer, featuring the Intel Corp. 80186 and the Zilog, Inc. Z80A microprocessors and 128K bytes of random-access memory.

The Ramjet PC reportedly runs both Microsoft Corp.'s MS-DOS and Digital Research, Inc.'s CP/M.

Ramjet PC options are said to include an integrated CRT terminal, a high-resolution color monitor with cabling and a Polo printer that prints at 120 char./sec. Ramjet's second external serial port reportedly will simultaneously or independently support letter-quality printers from NEC Information Systems, Inc., Qume Corp. and Epson America, Inc. Ramjet is priced at $1,995.

Polo Microsystems, 2570 El Camino Real W., Mountain View, Calif. 94040.

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Recommends The Diablo 630 Series

David Jamieson Carlyle recommends the Diablo 630 Series.

The most versatile line of daisy wheel printers for serious business applications.

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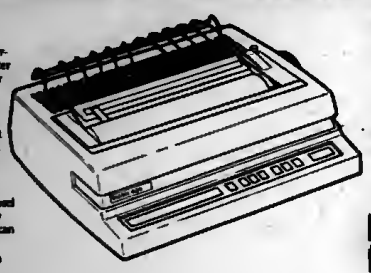

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	(800) 327-6890

DJC

CORONA from page 61

8-MHz 8088-2 microprocessor and 256K bytes of RAM (expandable to 512K bytes).

The central system unit also features a hard-disk controller with clock/calendar; choice of a 10M-, 20M- or 40M-byte Winchester disk drive; a 16K-byte read-only memory Basic Input/Output Subsystem that boots to hard disk; a floppy disk drive; one serial port; and one Centronics Data Computer Corp.-type parallel port. Options include a second 10M-, 20M- or 40M-byte hard-disk disk drive and a 10M-byte removable-cartridge Winchester disk drive.

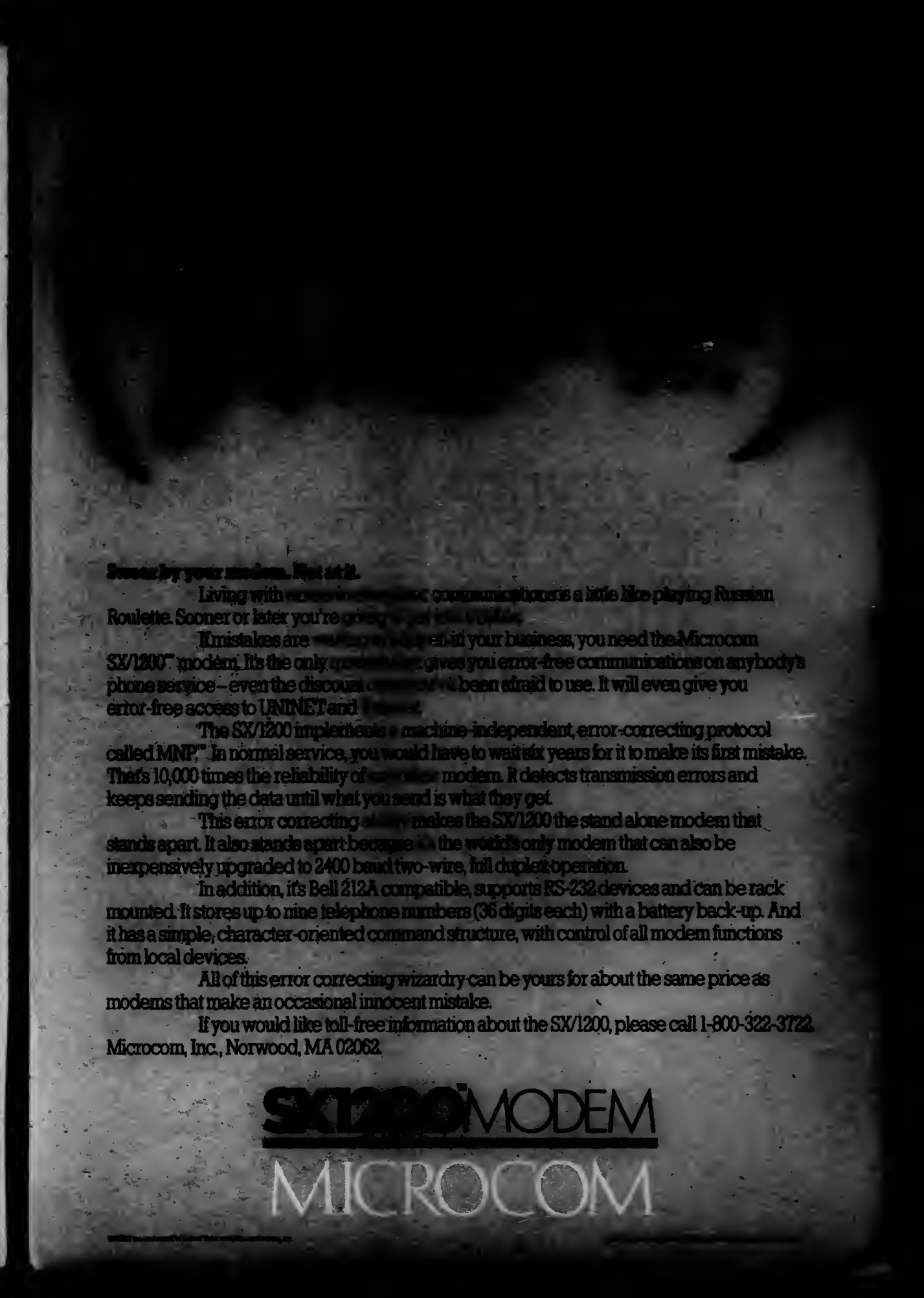
Additional users can be added to the system by adding a terminal and an APC user board to the system for each new user. Each workstation terminal includes a 14-in. green phosphor nonglare screen with 640- by 400-pixel resolution.

A two-user system with 256K bytes of RAM per user and a 10M-byte hard disk drive will cost $7,805. Each additional workstation, including APC, is priced at $1,495. An eight-user configuration will cost between $17,000 and $18,000, Corona said. Shipments are scheduled to begin in September.

In the same announcement, Corona introduced the Corona Laser Printer, which the firm said features 300 by 300 dot/in. resolution for text and graphics and prints at less than 55 db. It can produce up to eight page/min of combined text and graphics, which the company said is equivalent to 440 line/min, or about 350 char./sec.

At present, the printer supports four fonts and type sizes. The printer design and printing mechanism, developed by Canon U.S.A., Inc., are combined with a logic card and support software designed by Corona. The printer will work with Corona's personal computers, IBM's Personal Computer and compatible single-user or multiuser systems, the company said. It is priced at $3,395 and is available now.

Corona is located at 275 E. Hillcrest Drive, Thousand Oaks, Calif. 91360.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If you would like toll-free information about the SX/1200, please call 1-800-322-3722. Microcom, Inc., Norwood, MA 02062.
MODEM
MICROCOM

TRAITS from page 61

tered, it is also important that the package possesses excellent text-handling capabilities. Existing word processing programs do not allow the user to access data quickly and move data in blocks between documents. Also, their techniques for labeling, storing and recalling data are very limited. Data base software provides fast storage and retrieval, but its rigid format and limited entry length make effective text manipulation impossible. The new software must possess the best features of both products.

One possible approach is to arrange data in stacks. The user's current project is open in a stack on the desk that is composed of as many records at any length as the user needs. A limited number of other stacks of temporary files are also available. Stacks may or may not be related to the open stack. The product also provides a cut-and-paste capability, a scratch pad, a cut-and-paste tray in which to save scraps of information and a wastebasket.

The tool allows users to put any information in any order and in any stack. Then they can flip through information as they would with a stack of papers. They can cut information from old records and paste it into any other record. If they are not sure where to place information, they can hold it in the cut-and-paste tray. Whenever an interruption occurs, they can quickly make a note on a scratch pad and refer to it later.

Obviously, to accomplish this unstructured interaction, the new data base must accept records of any length and type, and all must be handled in the same way. It cannot require a rigid format for different types of records. This differs from traditional software, in which all entries either would or would not include a field for an international phone number. The new data base allows this phone field to be entered only when appropriate. Each customer's file entry has as much or as little data as users desire.

The data base also allows variable-length records to be changed dynamically. In the new data base, users can alter the size of any field without asking the system's permission. They simply enter the new data, and the personal computer accepts it automatically.

A significant feature of the software is that it deals with ideas, not just data. Files are stored and retrieved based on contents rather than rigid file names. A businessman may ask his secretary for "that information I gave you from that telephone call I got last Friday from Smith." The secretary associates these clues with the contents of the note and finds the file.

So, too, the productivity data base must be able to retrieve information from various clues that the user gives it. A document can be recalled based on any of its key words so that it can be retrieved even if only the smallest portion of the content can be remembered. Because each record carries with it the parameter information required to define it, it is also easy to move and dynamically combine individual record blocks.

Despite some obstacles, the fifth generation of personal computer software is well under way. This new software is needed, because the personal computer cannot fulfill its promise without it.

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UCLA EXTENSION

BUSINESS & MANAGEMENT

RUMORS from page 61

The problem with unnamed sources is that their information is almost always secondhand and is based more on guesswork than on facts.

Everyone can sense the major trends in the microcomputer market, and everyone can gauge what products a given company may develop. Large companies like IBM are always working on a number of development projects.

However, most products never make it to market. Earlier this month, Ben Rosen, chairman of Compaq Computer Corp., claimed that Compaq had canceled two projects before they came to market. If Compaq killed two, try to imagine how many IBM efforts end up gathering dust in the lab.

Rosen cast doubts on the lap computer market. Earlier this year, rumors were flying that Compaq was about to enter the lap market. Could the lap computer be one of the two products that Compaq killed? Probably.

Even though Rosen declined to comment, that is the kind of juicy rumor that all too often leads to a story that cannot be confirmed. If the story goes into print, the rumor often gains widespread credence and then is embellished by additional rumors and hearsay.

Some vendors take advantage of the rumor mill by leaking gossip. While at Commodore Business Systems Ltd., Jack Tramiel played a masterful game of boldly spreading rumors, gauging industry reaction and then deciding what to do with a product.

Publications also quietly drop rumors that never become facts, but they do boast of those tips that come true. Getting the story accurately has taken a second seat to printing inaccurate information first.

Personal computer managers are caught in the middle of this situation. When users hear of future products, often an immediate craving for these products arises. Convincing users that the product may not even exist, and probably will not be as good as initial reports, may be a difficult task.

And deficiencies become evident only after the product has shipped. Users are just now beginning to voice dissatisfaction with the IBM 3270 Personal Computer. Limitations to Lotus Development Corp.'s Symphony have not kept it from reaching the No. 2 slot on Softsel Computer Products, Inc.'s Hot List. Shortcomings for the Personal Computer AT will become evident only long after rumors of its dual processors and 10M-byte hard disk have faded.

REACTION from page 61

tiuser version of PC-DOS," Stuart said.

Meanwhile, one personal computer administrator was more concerned with compatibility between the Personal Computer AT's PC-DOS 3.0 and existing versions of PC-DOS than with future Personal Computer AT operating systems. "We now have 55 IBM Personal Computers, so our concern is compatibility between these machines and the [Personal Computer] AT," commented Gene Maimin, project manager of microcomputer support at Columbia Pictures Industries, Inc.

Big Blue's new Topview operating environment represents the first major IBM microcomputer software product developed entirely in-house, analysts said. "IBM's software represents a big blow to microcomputer software companies," according to Harry Edelson, vice-president of research at First Boston, Inc. in New York. "IBM has come of age in the software arena."

George Colony, president of Forrester Research, Inc. in Cambridge, Mass., added that IBM will probably dominate the operating system environment and leave the rest of the market to application vendors.

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COMPUTER INDUSTRY

Speaker: Tax law changes call for rapid action

By Peter Bartolik
CW Staff

BURLINGTON, Mass. — The recent tax law change that produced a windfall for many high-technology vendors with international sales also provides for a complicated new taxing structure that will require rapid action from those same vendors, a tax specialist noted here recently.

George J. Yost, a tax partner with the Boston office of the Coopers & Lybrand accounting firm, told a gathering of representatives of high-technology companies that the same tax law change that forgave deferred taxes for many companies also could result in new exposure to foreign taxes.

When the Tax Reform Act of 1984 was signed into law last month, it in most cases eliminated the domestic international sales corporations (Disc) used by many U.S. companies as an accounting tool for recording foreign sales and profits. The former Disc provisions of the federal tax codes had provided for deferred taxes that had accumulated on parent company books, and the recent amendments provided for those deferred taxes to be retained by companies as tax-free profits. Hewlett-Packard Co., for example, recently reported that the elimination of the Disc tax liability would add $128 million, or 50 cents per share, to company profits for the year.

Yost, speaking at a seminar hosted by Coopers & Lybrand's High-Technology Industry Group, pointed out that the changes require the elimination of Discs by Dec. 31, but also require an alternative to be formed Jan. 1.

The alternative, foreign sales corporations (FSC), requires several substantive changes on the part of companies engaging in international sales, according to Yost. Whereas the Disc was essentially a U.S.-based paper corporation "usually kept in a bottom drawer," Yost said, FSCs must be located in foreign countries or U.S. possessions and must employ a foreign management organization.

FSCs must meet four tests, Yost said. First, they must prove a "foreign presence," operating under the laws of the host country and possibly faced with taxation by the host country, and the host country must comply with U.S. tax information exchange requirements for the company to be considered an FSC. This essentially eliminates tax havens such as Bermuda that do not collect and exchange detailed tax data, according to Yost.

The second test is to prove foreign management, which requires bank accounts outside of the U.S., at least one non-U.S. resident on the FSC's board of directors and the holding of all shareholder and board of directors meetings outside of the U.S. Referring to the last requirement, Yost jokingly urged the executives at the meeting to "lobby hard" for appointment

See TAXES page 89

IBM net plans: A test of EEC resolve?

INDUSTRY INSIGHT
Peter Bartolik
CW Senior Editor

IBM's "direction" in developing a comprehensive local-area network could provide the basis of the first test, and perhaps first strain, of the Aug. 1 compromise by which the European Economic Community (EEC) Commission suspended its antitrust investigation of Big Blue.

Perhaps hoping to mollify the stock market, and perhaps hoping to convince users to defer local-area network plans, IBM has in recent months issued two statements concerning its plans for a token-ring local-area network. When IBM announced the IBM Cabling System this spring that will provide the central nervous system of its token-ring local-area network [CW, May 14], the company issued a statement of intent, admitting that what it defines as a local-area network will not be available for two or three years.

In announcing its Personal Computer AT recently [CW, Aug. 20], IBM issued a statement of direction saying that the IBM PC Network, announced at the same time as the Personal Computer AT, and a planned industrial network will both be linked to the token-ring local-area network.

So far, IBM has revealed the token-ring local-area network's projected speed (4M to 16M bit/sec), media (IBM's own Cabling System), planned usage, planned interconnection and planned interface to IBM 370 architecture applications.

IBM has not revealed, however, how this network will be implemented and what its price will be.

Technically, there has been no product announcement of the token-ring local-area network.

But in announcing the PC Network and its planned connectability to the token-ring local-area net, along with announcing the concept of the token-ring local-area net, IBM has certainly provided enough fodder for users to chew and consequently perhaps defer their local-area network purchase plans until IBM is good and ready to come to market.

The compromise IBM handed the EEC requires IBM to release within four months after announcement technical in-

See IBM page 89

Portable vendors urged to target unique niches

By Kathleen Burton
CW West Coast Bureau

SAN FRANCISCO — Technological limitations and the failure of vendors to develop unique strategies and products were blamed by industry participants here recently for the failure of the portable computer market to live up to expectations.

A variety of industry participants pointed out several shortcomings in the portable computer industry during a conference held here by Future Computing, Inc.

The portable market for ac and battery-powered machines is projected to reach almost four million units annually by 1988, according to Future Computing estimates. The market research company said 700,000 units will be sold this year.

Dr. Egil Juliussen, chairman of the board of Future Computing, said that technological advances likely to be incorporated into portable computers in the future will include such standards as communications interfaces with cellular radio and modems on a single chip.

Vendors pointed out the limitations of

See PORTABLE page 88

■ Three-year-old Fortune Systems Corp., which recently declared its problems were all in the past, may acquire North Star Computer, Inc. Meanwhile, Computerland Corp. lodged a suit seeking $3 million and alleging that Fortune's 32:16 system didn't live up to vendor claims/74

■ ITT Corp. recently bought additional stock in a British telecommunications vendor in light of that company's pending acquisition of Britain's largest computer manufacturer/77

■ Cullinet Software, Inc. reported recently that quarterly profits and revenues both were up more than 50% over year-earlier results/81

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Fortune posts profitable quarter, says hard times over

By Kathleen Sullivan
CW West Coast Bureau

REDWOOD CITY, Calif. — Fortune Systems Corp., a three-year-old company that sells Unix-based microcomputers, did not have a good year in 1983.

But in a recent press conference, called to highlight Fortune's profitable second quarter of this year, the company said it has left the hard times behind and is ready to compete effectively in the market.

The string of difficulties last year included product delays, performance problems in its 32:16 multiuser system (see story below), a management shake-up and significant financial losses over four consecutive quarters, including the first quarter of 1984.

With the close of its second fiscal quarter, ended June 30, Fortune reported revenues of $20.3 million, up 69% from $12 million a year earlier. Net income for the quarter was $39,000, compared with a loss of $3 million in last year's second quarter.

According to LeRoy Cochran, Fortune's senior vice-president and chief financial officer, Fortune has successfully tackled the technical and marketing problems that ran the company aground last year. "We have improved the reliability and performance of our hardware and software and introduced new products," Cochran pointed out.

In addition, the firm has realigned its distribution network, de-emphasizing retail sales and relying more on value-added resellers and an expanded national accounts program to market the system.

According to David Lawrence, senior technology analyst with San Francisco-based Montgomery Securities, Fortune has "straightened itself out product-wise and organizationally." Yet, although many have predicted a high demand for multiuser systems, Lawrence said, no one knows how quickly users will adopt the systems.

Analysts at Gnostic Concepts, a Calif.-based market research firm, predicted that shipments of Unix-based microcomputers, which in 1983 stood at 63,300 units, will triple by 1985.

In addition to the challenge of marketing its current system, Fortune will face the task of developing new products in order to remain competitive, Lawrence said.

John Dunham, managing analyst with Gnostic Concepts, said Fortune had taken significant steps to resolve its technical and fiscal problems. From a strictly financial point of view, the company has a strong stature, Dunham said, noting that its ratio of current assets to current liabilities (8:1) is an impressive one.

Dunham said the lessons Fortune learned in selling its system will put the firm ahead of IBM in the market, at least for the time being.

"We have significant reservations about IBM's ability to succeed with a multiuser system in the retail market," Dunham said. Customers who have purchased multiuser systems are "very significantly dependent" on the manufacturer for support and service, he said. Retailers, which are already "stretched to the limit offering support for [Personal Computer] XT-type computers," won't be able to offer the support required by multiuser customers, Dunham said.

Aharon Orlansky, senior high-technology analyst with Sutro & Co., a San Francisco brokerage firm, questioned Fortune's long-term viability, noting that Fortune's market niche had proven to be a mine field for many small companies.

Orlansky said only the larger companies in the market would be able to devote the necessary financial resources and attention to service and support that the multiuser market demands.

And IBM's entry to the market adds a new dimension with which to reckon, Orlansky added. "Until now, life has been rosier because IBM was missing from that price range," he said.

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North Star buy discussed

REDWOOD CITY, Calif. — Fortune Systems Corp. last week announced it was involved in discussions to acquire North Star Computers, Inc. of San Leandro, Calif.

Fortune, which just recorded its first profitable quarter following four consecutive losing quarters (see story above), said the merger would entail its acquiring all of the outstanding stock in North Star in exchange for four million shares of Fortune stock. Fortune also said it had provided North Star with a $3.75 million debt financing convertible to 19% of North Star stock.

Based on the value of the debt financing, that would place the value of a 100% acquisition at slightly less than $20 million.

North Star recently began shipping an IBM-compatible multiuser microcomputer system. Fortune manufactures a multiuser system operating under the Unix operating system.

Computerland files suit

HAYWARD, Calif. — Computerland Corp. recently filed suit against Fortune Systems Corp. charging alleged fraud, breach of contract and misrepresentation involving Fortune's promotion of its 32:16 microcomputer systems.

Computerland, the computer retail giant, is seeking in its suit $2 million in exemplary damages, $1 million in punitive damages and a yet-to-be-determined amount for unsold inventory, lost royalties and other damages. The suit was filed here earlier this month in the Superior Court of California for Alameda County. It claimed that Computerland entered into an agreement with Fortune Systems in January 1982 to market Fortune's 32:16 systems. Computerland ordered "hundreds of thousands of dollars worth" of the systems.

In its suit, Computerland alleged the systems did not live up to Fortune's claims and the retail chain's franchisees were "dissatisfied with both the hardware and software." The suit added that the 32:16's Unix-like operating system and multiuser capabilities failed to live up to Fortune's claims.

In addition, the system's high-resolution color graphics capabilities failed to match stated claims, the suit alleged.

A spokesman for Fortune said he had not seen the suit and therefore would not comment on it.

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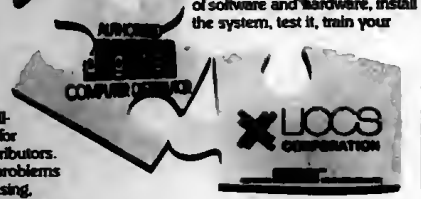

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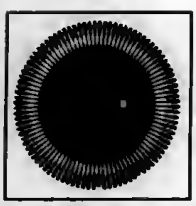

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COMPUTER INDUSTRY

Backed by significant venture capital, chip start-ups flourish

OUTSIDE LINES
Bohdan Szuprowicz

By Bohdan O. Szuprowicz
Special to CW‡

Bohdan O. Szuprowicz is president of 21st Century Research of North Bergen, N.J., and publisher of Supergrowth Technology USA.

Few people are aware of an underlying critical industry that conceives, develops and makes the sophisticated equipment that produces the increasingly complex superchips without which the electronics industries of the world would come to a grinding halt.

Without advances in the semiconductor manufacturing equipment industry, integrated circuit producers would not be able to come out every two years with a new, more powerful generation of chips.

Industry sources estimate integrated circuit manufacturing equipment sales worldwide at over $3 billion in 1983 and expect that equipment sales will increase to anywhere between $4 billion to $5.6 billion in 1984 as semiconductor manufacturers gear up for production of new generations of very large-scale integration (VLSI) microchips. This means rapid growth in anyone's book, and it has not escaped the attention of many smart money venture capitalists who are allocating significant amounts of new funds to finance start-ups in this explosive industry.

Putting on the pressure

Increasing demands for VLSI and customization from users and makers of artificial intelligence, automation, voice recognition, vision, image processing and electronic warfare systems are putting unusual pressure on integrated circuit manufacturers who realize that if they want to stay in competition, they may have to start producing superchips with as many as a million functions each before the end of the 1980s.

As a result, many are spending heavily on new equipment that will be able to handle VLSI products development and fabrication. These are devices that utilise chemical vapor deposition (CVD) and diffusion technologies to form thin films of electrically conducting or insulating materials on silicon wafers. Very dense VLSI circuit manufacturing requires lower pressures and lower temperatures that can be achieved with newer plasma-enhanced CVD reactors.

Similarly, liquid chemical processes used to etch integrated circuits on those wafers are inadequate for dense VLSI chips that require dry plasma technologies with which much thinner circuit lines can be etched.

About a dozen well-established semiconductor manufacturing equipment producers, dominated by U.S. and Japanese companies, are now scrambling to fill the demand. At the same time, at least 15 new start-ups have been formed in hopes of carving out a niche for themselves with the most advanced VLSI production technology.

A most intriguing initiative in this new industry has been taken recently by Kleiner Perkins Caufield & Byers. In mid-1984, this venture firm began financing a group of integrated circuit manufacturing equipment start-ups spanning several aspects of the industry and sharing management expertise.

The most innovative of those is Flexible Manufacturing Systems, which is developing computer-integrated manufacturing systems for VLSI production. It includes a specialised robotics system transporting silicon wafers through different processes under central computer control.

The firm's management is particularly impressive, since it includes ex-presidents of Censor and Lam Research Corp., each of which is an innovative firm at the leading edge of VLSI manufacturing technology.

The company already received $2.25 million in financing from Kleiner Perkins, which also invested an equal amount in Focus Semiconductor Systems, a new CVD equipment start-up headed by top executives from Applied Materials, Inc., an established leader in VLSI etching systems.

Innovus, another start-up developing flow-control equipment for the industry, is also receiving $1.1 million, and Eratron, a thin-film equipment power supply systems maker, gets $850,000 from the same venture firm or its principals and associated investors.

Genus is a 1982 venture firm developing plasma thin-film CVD systems for licensing to manufacturers of ultrapure semiconductors that are mandatory for the VLSI generation which is much less tolerant of even the most microscopic impurities.

This venture is well-financed to the tune of $21.2 million by such leading venture capital firms as the Hillman Co., Citicorp Ventures and Prudential Bache Metal Co.

Also in the CVD equipment business are new ventures like Anicon, which received $7.6 million in financing from Adler & Co. W.R. Grace & Co. and Salzers and Benzing are two other start-ups in formative stages entering the plasma processing equipment business.

Advanced Semiconductor Materials, a Dutch company, claims world leadership in plasma-enhanced CVD reactors and went public in the U.S. at $29 per share in September of last year.

Law Research, which manufactures VLSI plasma etch systems, is a recent start-up whose revenues skyrocketed to $5.1 million in 1983 and are expected to triple this year.

The company was extremely well-financed by leading high-technology venture firms and went public in May 1984 at $10 per share with Hambrecht & Quist and Goldman Sachs & Co. co-managing the underwriting assignment.

Szuprowicz is president of 21st Century Research of North Bergen, N.J., and publisher of Supergrowth Technology USA.

COMPUTER INDUSTRY

Britain's STC acquires ICL Ltd.; ITT boosts STC holdings to 36.9%

NEW YORK — ITT said recently that it has acquired an additional five million shares of Britain's Standard Telephone & Cables PLC (STC), in the wake of STC's apparent success in acquiring Britain's largest computer vendor, ICL Ltd.

ITT formerly owned 35.4% of STC's shares, which would have been diluted to about 24.9% by the ICL acquisition. ITT said it wants to retain 29.9% of STC stock; the additional five million shares will boost ITT's holding in STC to 36.9% before the ICL acquisition is realized.

STC, a vendor of telecommunications products with sales estimated in excess of $1 billion, launched a surprise bid for ICL in late July (CW, July 30) after acquiring slightly less than 9% of ICL's stock.

Initial rejection

ICL initially rejected STC's offer to purchase all remaining stock for a total valuation of about $465 million. STC recently upped its bid to a total valuation of about $545 million, however, and ICL agreed to a merger that, according to a joint statement, "will combine the strengths of ICL in computer systems and software and of STC in network and transmission systems."

In New York, an ITT spokesman indicated that the company supported STC's position in making the acquisition.

The spokesman said the company did not anticipate any problems to arise from ITT's indirect relationship with ICL, even though Britain's opposition Labor Party has reportedly criticized the merger on the grounds that it might allow ITT to gain influence over a large segment of the British computer industry.

Informatics reorganizes company

WOODLAND HILLS, Calif. — Informatics General Corp. recently announced the resignation of its president, Bruce T. Coleman, and the reorganization of the company into two major units for systems and applications.

The company said Coleman resigned for personal reasons. Dr. Walter P. Bauer, presently chairman of the board and chief executive officer, will assume the additional title of president.

The reorganization establishes two units, Informatics Systems and Informatics Applications, the company said. The systems unit will be responsible for Fortune 1000-size customers and federal government customers. The applications unit will concentrate on such vertical markets as law, accounting, insurance and distribution.

"The new plan is designed to better align the Informatics structure with the two major markets the company addresses," Bauer said.

Telex buy completed

LEXINGTON, Mass. — Raytheon Co. and Telex Corp. said recently that they have completed the transfer of most of the operations of Raytheon's Data Systems Division to Telex.

Raytheon closed the division in May because of lagging sales of its computer terminals and equipment. In June, Telex, based in Tulsa, Okla., purchased the operations for $200 million.

Telex Computer Products, Inc., a wholly owned subsidiary of Telex Corp., will operate the former Raytheon division under the name of Telex Data Systems Division. Administrative offices will remain at the former Raytheon headquarters in Norwood, Mass.

TODAY'S VAX FAMILY: UNPRECEDENTED COMPATIBILITY FROM THE DESK TO THE DATA CENTER.

Digital's VAX™ systems have earned an enviable reputation as the best-engineered computer family in the world. Since their introduction, VAX-11/730, VAX-11/750, VAX-11/780 processors and VAXcluster™ systems have set the industry standard for processor-to-processor compatibility.

Now VAX system compatibility has been extended to unprecedented proportions, with the addition of the new MicroVAX I™ and VAX-11/725 systems at the low end, and the new VAX-11/785 system at the high end. Software is completely compatible; VMS,™ a multi-user, multi-tasking virtual operating system, runs on every VAX processor. This means you can apply compatible processors – with compatible architecture, data registers, file structures, languages, utilities and networking options – to an incredible range of applications. VAX system compatibility includes UNIX™ software environments, too. In fact, Digital's VAX computer line is the first 32-bit computer series in the world to support a virtual memory implementation of UNIX software. And Digital's ULTRIX™ operating system gives you a single source UNIX software solution optimized for VAX system performance.

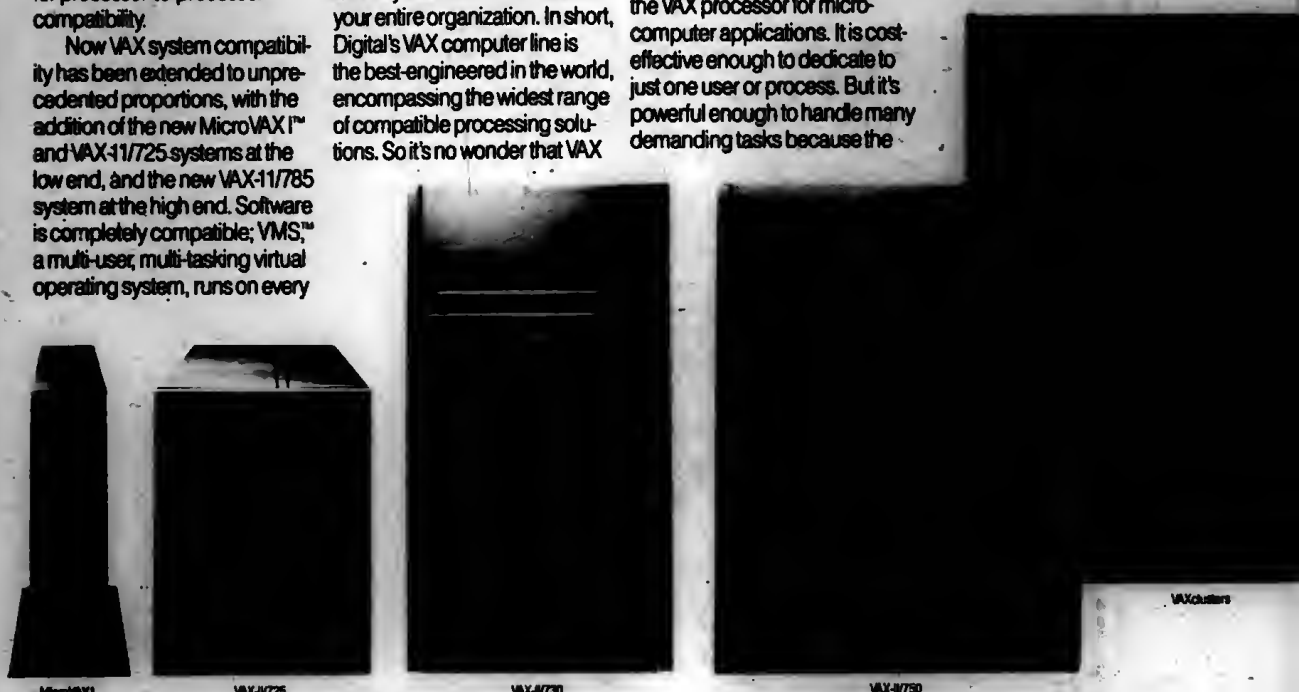
Within the VAX computer family, compatibility can range from systems that fit on a desktop and economically support a single user to systems that occupy a data center and can effectively handle the workload of your entire organization. In short, Digital's VAX computer line is the best-engineered in the world, encompassing the widest range of compatible processing solutions. So it's no wonder that VAX systems have become the most popular 32-bit computers.

THREE NEW EXTENSIONS ENGINEERED FOR WIDE-RANGING SOLUTIONS.

The MicroVAX I system is the VAX processor for microcomputer applications. It is cost-effective enough to dedicate to just one user or process. But it's powerful enough to handle many demanding tasks because the MicroVMS™ operating system gives you the same utilities, development aids and languages as the full VMS operating system.

The VAX-11/725 system is designed for the office. It is so compact it can fit under a desk. Yet it runs full VMS software, and can support up to eight users. Plus it's quiet and requires no special air conditioning. It's the VAX system to choose when your applications require more memory and storage capacity than the MicroVAX I system offers today.

The VAX-11/785 system, our latest top-of-the-line VAX computer, is the highest performance processor of the VAX computer family. Cache is a full 32 thousand bytes, a special advantage if your programs contain many complex subroutines. There's also an optional floating point



VAX FAMILY COMPATIBILITY

TODAY'S VAX FAMILY.

MicroVAX I, VAX-11/725, VAX-11/730, VAX-11/750, VAX-11/780, VAX-11/785 and VAXcluster systems.

OPERATING SYSTEMS.

VAX processors support VMS and ULTRIX operating systems.

INFORMATION MANAGEMENT.

VAX systems support the VAX Information Architecture, which includes the VAX DBMS CODASYL database, VAX Rdb relational databases, the Common Data Dictionary, DATATRIEVE™ query language and application generator, DECgraph™ business graphics software, DECslide™ 35mm slide generator, VAX VTX™ videotex system, FMS™ Forms Management System, TDMS Terminal Data Management System, and ACMS Application Control and Management System.

PROGRAM DEVELOPMENT.

VAX systems support APL, BASIC, BLISS, C, COBOL, CORAL 66, DIBOL,™ DSM (Digital Standard MUMPS), FORTRAN, PASCAL, PL/I, RPG II, LISP, OPS5 and Digital's MACRO assembly language.

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accelerator for your numeric-intensive applications. And wherever floor space is a concern, the VAX-11/785 system gives you a special advantage because it fits in the same size cabinet as a VAX-11/780 processor.

VAXCLUSTER SYSTEMS: THE POSSIBILITIES ARE ENDLESS.

Even the top of the line isn't the end of the line of the VAX computer family, because you can link multiple processors together and manage them as a single unit in a VAXcluster system. This capability, which is unique in the industry, enhances data integrity, increases system availability, and does it all with complete user transparency. Moreover, it permits the resources of a single facility to be shared throughout your organization, and lets you keep pace with expanding needs through incremental system growth. As many as 16 processors and storage servers can be combined in a single VAXcluster system, delivering virtually unlimited computing capacity.

FLEXIBLE NETWORKING FOR TODAY AND TOMORROW.

The benefits of VAX system compatibility go far beyond expansion from one VAX processor to another, because the efficient communications options provided through Digital Network Architecture let you get the maximum benefit from all your installed systems – including non-Digital systems.

With DECnet™ network capabilities, multiple VAX processors and VAXcluster systems can exchange messages, transfer files, update database records, execute programs and share peripheral and processor resources in local and wide-area network configurations – transparently to both the user and the program. Adaptive routing helps ensure optimum reliability and transmission efficiency. This resource-sharing can incorporate all the VAX systems you own, and many others as well. Gateways let you use dial-up or dedicated lines, Ethernet high-speed local area networks, X.25, packet-switched data networks, PBX, 2780/3780, 3270 and SNA.

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The chief advantage of the architectural compatibility we've engineered into every member of the VAX computer family is the return-on-investment it gives you. You can start anywhere and expand up or distribute down as your needs dictate. And you won't have to retrain, reprogram, restructure files or abandon the system you began with.

The VAX computer family's unmatched applications versatility means that every area of your operations – from the factory floor to the engineering lab to the executive office – can take advantage of the unequalled value of VAX systems. The VAX Software Source Book lists many of the thousands of applications developed and supported by Digital and independent vendors. And they're all available for installation now.

BEST ENGINEERED MEANS ENGINEERED TO A PLAN.

Digital's VAX computers, like all Digital hardware and software products, are engineered to conform to an overall computing strategy. This means our systems are engineered to work together easily and expand economically. Only Digital can provide you with a single, integrated computing strategy direct from desktop to data center.

For more information on VAX computer systems – or if you would like to receive a complimentary copy of Digital's VAX Software Source Book and the VAX Family Brochure – contact your local Digital sales office. Or call 1-800-DIGITAL, ext. 200.

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VAX-11/785

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Buy-in moves GM closer to acquiring EDS

DETROIT — General Motors Corp. moved several steps closer to its acquisition of Electronic Data Systems Corp. (EDS) recently with the announcement of a definitive merger agreement and a purchase agreement for about 48% of EDS stock.

The $2.5 billion acquisition, announced in late June, is subject to approval by EDS shareholders and to approval by GM shareholders of a plan to issue a new class of General Motors common stock.

EDS shareholders may elect, according to GM, either $44 in cash for each share of EDS stock or a combination of $35.20 in cash plus two-tenths of a share of the new GM Class E common stock plus a contingent promissory note that will be non-transferable except in certain limited circumstances.

The promissory note essentially provides shareholders of Class E stock with a guarantee that the total of a Class E share plus a promissory note will be valued at $125 in seven years, with GM making up the difference, if any, if the market value of the stock is less than $125.

GM also announced it had reached an agreement to purchase 28.3 million shares of EDS stock from company founder H. Ross Perot, the Perot family trusts and certain other members of EDS management.

The Class E stock GM plans to create had caused some concern on Wall Street because of New York Stock Exchange (NYSE) prohibitions against creating new classes of stock with disproportionate voting rights; the Class E stock would have only half the voting rights of other GM stock classes. However, NYSE reportedly said recently that it does intend to trade the new stock on the exchange.

Dallas-based EDS recently reported profits of $71.1 million, or $1.26 per share, for the year ended June 30, a 21% increase over the previous year when profits were $58.6 million, or $1.05 per share.

EDS reported annual revenues of $786.1 million for the year just ended, an increase of 21% compared with $651.5 million in 1983.

Amdahl aiming to lower costs with labor cuts

By Jeffry Beeler
CW West Coast Bureau

SUNNYVALE, Calif. — Amdahl Corp., seeking to trim its overhead and streamline its operations, recently cut its worldwide 7,200-member work force by approximately 4%.

The dismissals, which affected 250 to 300 employees in a varied assortment of job functions, are expected to have no impact on Amdahl's product development or delivery schedules, according to company spokesman Richard Whitcomb.

The layoffs resulted from an "across-the-board" consolidation of the mainframe maker's business activities and work assignments, Whitcomb said.

"Throughout the company, we reassessed our priorities and reduced our work scope in an effort to sharpen our business focus and eliminate redundancies," he said.

Amdahl's consolidation move, which reportedly has had no effect on the company's basic organization or structure, follows two years of rapid growth.

'Catch its breath'

After having added some 700 employees to its payroll since last January, the company wanted to "catch its breath and see if we could find a better way of doing things, and we did," Whitcomb said.

Whitcomb dismissed suggestions that the personnel cuts are related to a recent decline in Amdahl's earnings. During the first six months of this year, the firm's net income totaled slightly more than $9 million, compared with $17 million for the comparable period in 1983.

As a result of its recent fat-trimming measures, however, Amdahl expects its profit picture for the remainder of the year to improve, Whitcomb said.

MSA announces DRA aquisition

ATLANTA — Management Science America, Inc. (MSA) announced last week it had acquired substantially all the assets of Distribution Research Associates (DRA) of Oak Brook, Ill., including its Distribution Resource Planning (DRP) mainframe software package.

MSA Chairman John P. Imlay Jr. said the DRP will enhance the capabilities of MSA's manufacturing, order processing and purchasing systems, and MSA will immediately begin working to integrate those systems with the software package.

Installation of the current DRP product will continue through 1984, MSA said, and an integrated product is scheduled for 1985.

DRP was described by MSA as a decision support product using forecasting and modeling tools to reduce inventory, improve transportation planning and increase labor productivity.

Cullinet's first-quarter profits, revenues up 50%

WESTWOOD, Mass. — Cullinet Software, Inc. recently reported that both revenues and profits for the first quarter were up more than 50% compared with the first quarter a year earlier.

According to a spokesman for the company, revenues for the quarter, which ended July 31, were $40.2 million, up 56% over the corresponding period a year ago when revenues were $25.7 million.

Profits rose 51% to $5.5 million, or 36 cents per share, compared with $3.6 million, or 24 cents per share, in the year-earlier period.

During the first quarter, Cullinet acquired Bob White Computing and Software, Inc., a company that specializes in banking applications software. However, no revenues from that acquisition were recognized in Cullinet's first-quarter report, the spokesman said.

HP reports profits of $134 million, posts revenue increase of 35% to $1.5 billion

PALO ALTO, Calif. — Hewlett-Packard Co. recently reported third-quarter profits of $134 million, or 52 cents per share, compared with year-earlier profits of $91 million, or 35 cents per share.

According to a spokesman for the company, revenues for the quarter were $1.5 billion, a 35% increase over the year-earlier revenues of $1.1 billion.

Included in the quarterly profits was an extraordinary item of $6 million, or 2 cents per share, resulting from recent federal legislation eliminating accrued tax liabilities of the domestic international sales corporations of U.S. companies, according to the spokesman.

The company restated prior quarters to reflect additional profits of $128 million, or 50 cents per share, as a result of the tax change, the spokesman said.

All four of the company's business segments showed third-quarter increases in sales and orders. The computer products segment had third-quarter revenues of $818 million, an almost 40% increase over year-earlier revenues of $585 million, the spokesman said.

John A. Young, the company's president and chief executive officer, commented that expenses grew at a slower rate than shipments and were "a definite improvement over the first half of the year."

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Lexidata head resigns from post

BILLERICA, Mass. — Andrew C. Knowles III recently resigned as president and chief executive officer of Lexidata Corp., a post he held for only 10 months following his departure from Digital Equipment Corp.

Although Lexidata said Knowles resigned for personal reasons, he was quoted in newspaper reports as saying he resigned following a failed attempt to raise capital to fund a workstation product.

Appointed to replace Knowles was Ross A. Belson, formerly senior vice-president of operations.

Knowles had been instrumental in the marketing of DEC's PDP-11 minicomputers and later DEC's personal computer line before leaving to join Lexidata, a manufacturer of graphics terminals and engineering workstations.

Knowles was the sixth vice-president to leave DEC in a two-year time span.

ITT to sell OSI software

FORT LEE, N.J. — On-Line Software International, Inc. (OSI) said it has reached a licensing agreement with ITT that gives ITT's European affiliates exclusive rights to market the full line of OSI's software in Europe.

The five-year agreement covers the marketing by ITT's local subsidiaries of OSI's systems software for IBM and IBM plug-compatible mainframe and microcomputers in Europe.

ITT also has been granted exclusive rights to market OSI's Omnimicro, a micro software program.

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GSA opens micro store

WASHINGTON, D.C. — The U.S. General Services Administration (GSA) recently opened, in Philadelphia, its second microcomputer store for federal customers, with projected first-year sales of $4 million.

The official opening of the GSA Office Technology Plus store at the William J. Green Federal Building in Philadelphia came after reports that the first store, located here, has generated high sales figures.

Ray Kline, acting GSA administrator, reported that after 10½ months in operation, the Washington store had achieved sales of more that $12.7 million, nearly five times the projected first-year volume.

The store provides federal employees with one-stop shopping for microcomputers and related products (such as software and printers), as well as counseling, training and follow-up advice.

The stores are operated by MBI/Math Box, Inc. of Bethesda, Md., under competitive contract with GSA.

MERGERS AND ACQUISITIONS

Inacomp Computer Centers, Inc., Troy, Mich., and **Compushop of Georgia, Inc.** have reached an agreement to merge. Under the agreement, Inacomp will acquire Compushop for an undisclosed amount of stock and cash.

■

CGA Computer, Inc., Horndel, N.J., announced that it has reached an agreement in principle with **General Atlantic Corp.**, New York, providing for the acquisition of CGA by General Atlantic through a cash merger in which the stockholders of CGA will receive $13 in cash for each of their CGA shares.

■

Prentice Corp., San Jose, Calif., has acquired the business of **Tek-Com, Inc.**, a privately held firm. The new company will operate as a wholly owned subsidiary of Prentice under the name of **Tek-Com Corp.**

■

Informatics General Corp., Woodland Hills, Calif., announced that it has acquired **Universal Computing Systems, Inc.** Terms of the acquisition were unavailable.

■

Dynapert, Beverly, Mass., has acquired 100% of the voting shares of **HTC Corp.**, Concord, Mass., forming the affiliate **Dynapert-HTC.** The final purchase price of the acquisition will be over $7 million.

■

McGraw-Hill, Inc., New York, has acquired **Future Computing, Inc.** of Richardson, Texas. Acquired for an undisclosed cash sum, Future Computing will operate as a unit of the McGraw-Hill Information Systems Co.

■

Robinson Nugent, Inc., New Albany, Ind., announced it has acquired the remaining 40% of **RE-AL, Inc.**, Wheeling, Ill.

Tymshare, Inc., Cupertino, Calif., announced that it has acquired the major assets of **Production Control Services, Inc.**, Chatsworth, Calif. Terms of the acquisition were not revealed.

■

Continental Telecom, Inc. (Contel), Atlanta, announced the signing of a definitive agreement with **Execucom Systems Corp.**, Austin, Texas, under which Contel will acquire Execucom in exchange for shares of Contel common stock valued at approximately $18 million.

■

Informatics General Corp., Woodland Hills, Calif., announced that it has acquired **Universal Computing Systems, Inc.**, a software

See MERGERS page 84

DEC to make investment in CAD firm

MAYNARD, Mass. — Digital Equipment Corp. and Scientific Calculations, Inc. (SC) of Fishers, N.Y., recently announced that DEC has agreed to acquire a minority interest in SC, a developer of computer-aided design (CAD) software for the electronics industry.

The investment, reportedly less than $15 million, will be used for expansion of ongoing business operations and software development, SC said.

The two companies have been cooperative marketing partners since 1979, when a program under which SC and others undertook joint marketing activities with DEC was instituted.

SC's Scicards and Meds software is used with DEC's VAX line for the design of printed-circuit boards and very large-scale integrated circuits.

SC is a privately held company founded in 1963.

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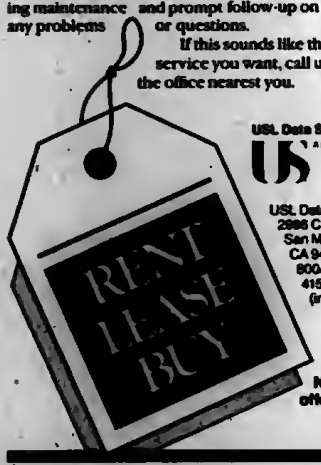

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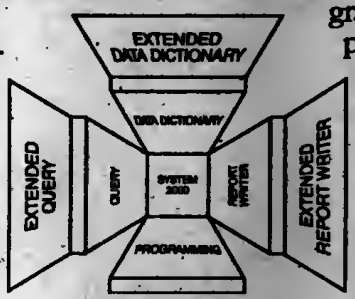

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COMPUTER INDUSTRY

MERGE from page 82

supplier to the construction industry in Florida. Terms of the agreement were not available.

■

Ramtek Corp., Santa Clara, Calif., announced that Ramtek's Los Angeles-based **Digital Productions** and other investors in Digital Productions have reached an agreement in principle with **Control Data Corp.** under which CDC will acquire 60% of Digital Productions for $5 million in cash plus the assumption and guarantee of certain obligations incurred by Ramtek in connection with the business of Digital Productions.

■

Mentor Graphics Corp., Beaverton, Ore., announced that an agreement has been reached to acquire **Synergy Dataworks, Inc.** The acquisition will permit Mentor Graphics access to the design expertise of Synergy personnel and will enable Mentor to incorporate some elements of Synergy's uncompleted first product in its future produce line. Terms of the acquisition were not available.

■

Advance Circuits, Inc., Hopkins, Minn., and **Multaplex Corp.** announced that they have reached an agreement in principle for the acquisition by Advance Circuits of the multilayer printed circuit manufacturing operations of Multaplex for approximately $15 million in cash and $3.2 million in securities.

The transaction is subject to negotiation of the definitive agreement and the approval of Multaplex shareholders.

■

Xytec International Industries, Inc., Burlingame, Calif., has acquired **Ratel Electronics, Inc.** of San Jose, Calif., for the acquisition of 100% ownership of Ratel from existing shareholders.

■

Key Image Systems, Inc., Chatsworth, Calif., announced it has acquired a majority in **I-sys Technology, Inc.**

I-sys, a closely held corporation, contracted with Key Image Systems in June 1983 to develop an advanced alphamumeric optical recognition system (AOCR) to read typewritten or printed documents into a word processor, communications channel or general-purpose computer. Under the terms of the contract, I-sys owns all patent and other rights to the AOCR and intends to market the product upon completion of its development.

■

Computer Sciences Corp., El Segundo, Calif., has purchased an equity interest in **Compufact**, Santa Ana, Calif., a company specializing in turnkey systems and software products for the manufacturing and distribution industries. Terms of the acquisition were not available.

■

Mentor Graphics Corp., Beaverton, Ore., announced that an agreement in principle has been reached to acquire **Synergy Dataworks, Inc.**

The acquisiton will give Mentor Graphics access to the design expertise of Synergy personnel and enable Mentor Graphics to incorporate some elements of Synergy's uncompleted first product into their future product line. The conditions of the sale were not available.

■

Ultimate Corp., Clark, N.J., announced the completion of the acquisition of the computer hardware sales and maintenance businesses of **General Computing Services (Australasia) Pty. Ltd.** and **GCS-Teledata Pty. Ltd.**

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Issue Date	Space Reservations	Material Close
October 1	September 1	September 8
November 1	October 1	October 8
December 1	November 1	November 8

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COMPUTER INDUSTRY

NUMBERS AND DOLLARS

Genrad, Inc. reported profits for the second quarter ended June 30 of $4.8 million, or 30 cents per share, compared with $3.2 million, or 21 cents per share, one year earlier. Revenues were $63.1 million, compared with $51.3 million in the same period one year ago.

■

Software AG Systems, Inc. announced revenues for the fourth quarter ended May 31 of $12 million, compared with $8.9 million in the comparable period last year. Profits were $1.8 million, or 29 cents per share, compared with $1 million, or 16 cents per share, a year earlier.

For the fiscal year ended May 31, revenues were $41.1 million, compared with $30 million one year earlier. Profits were $5.9 million, or 96 cents per share, compared with $1.2 million, or 20 cents per share, for the year-earlier period.

■

M/A Com, Inc. announced profits for the third quarter ended June 30 of $10.7 million, or 25 cents per share, compared with $8.3 million, or 20 cents per share, in the same period one year earlier. Revenues were $198 million, compared with $159.8 million in the same period one year ago.

■

Informatics General Corp. reported an increase in revenues in the second quarter of $50 million, compared with $41.3 million in the same period one year ago. Profits decreased to $335,000, or 5 cents per share, compared with $1 million, or 2 cents per share, from the comparable period one year ago.

■

Computer Associates International, Inc. announced revenues for the first quarter ended June 30 of $22 million, an increase of 36% over revenues of $16.1 million for the same period last year. Profits increased 116.5% to $1 million, or 9 cents per share, compared with $473,000, or 5 cents per share, for the first quarter last year.

■

Computervision Corp. reported revenues for the second quarter ended June 30 of $133.5 million, compared with $94.2 million for last year's second quarter. Profits were $10.8 million, or 38 cents per share, compared with $7.99 million, or 28 cents per share, in the comparable period one year earlier.

■

Compaq Computer Corp. announced revenues for second-quarter 1984 of $65.9 million, compared with $18.1 million in the same period a year ago. Profits were $892,000, compared with a loss of $1.2 million for the year-earlier quarter.

■

Seagate Technology, Inc. reported revenues of $100.4 million for its fourth quarter ended June 30, compared with $46.3 million in the same period a year ago. Profits were $11.4 million, or 26 cents per share, compared with $7.2 million, or 17 cents per share, in the same period one year earlier.

■

Computer Sciences Corp. reported profits for the first quarter ended June 29 of $4.6 million, or 34 cents per share, compared with $2.5 million, or 19 cents per share, in the year-earlier quarter. Revenues were $173.3 million, compared with $174.2 million for the same period last year.

■

Comshare, Inc. reported fiscal-year profits of $1.4 million, or 34 cents per share, compared with $1.3 million, or 31 cents per share, a year ago. Revenues totaled $73 million, down from $76.3 million last year.

■

Cray Research, Inc. reported revenues for the second quarter ended June 30 of $42 million, compared with $28 million for the same period a year ago. Profits were $4 million, or 27 cents per share, compared with $1.7 million, or 12 cents per share, for the same period one year earlier.

■

Western Union Corp. announced profits for the quarter ended June 30 of $5.3 million, or 8 cents per share, compared with $27.6 million, or $1.05 per share, in the same period one year earlier. Revenues were $284.3 million, compared with $256.5 million in the comparable period one year ago.

■

Mohawk Data Sciences Corp. reported a revised loss for the year and quarter ended April 30 as a result of a legal judgment against its MDS Qantel subsidiary. For the quarter ended April 30, the revised loss amounts to $59.7 million, compared with $56.4 million originally reported. The revised total year loss is $52.9 million, vs. $49.6 million reported previously.

■

System Integrators, Inc. reported revenue for the third quarter increased slightly to $12.5 million, up from $12 million in the year-earlier quarter. Profits declined to $1.5 million, or 15 cents per share, compared with $1.7 million, or 18 cents per share, last year.

■

Compugraphic Corp. reported revenues for the quarter ended June 30 of $94.7 million, an increase of 20% over the year-earlier revenues of $78.7 million. Profits were $6 million, or 72 cents per share, compared with $4.5 million, or 55 cents per share, for the year-earlier quarter.

■

Dataproducts Corp. reported revenues for the first quarter ended June 30 of $121.5 million, compared with $80.6 million one year earlier. Profits were $8.7 million, or 42 cents per share, compared with $2.9 million, or 15 cents per share, for the same period one year ago.

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COMPUTER INDUSTRY

EXECUTIVE CORNER

C. W. Rea has been appointed president and chief operating officer at Gavilan Computer Corp. Mr. Rea will take a leave from his duties as general partner of New Enterprise Associates of San Francisco, an investor in Gavilan.

■

Bob Carnutte, formerly president, has been appointed chairman of the board, and **Mason Grigsby**, formerly executive vice-president, has been named president at Acctex Information Systems.

■

Donald L. Bise has been elected president and **Nelson E. Boyd** senior vice-president of marketing at Comsat Technology Products, Inc.

■

Paul W. Wiedenmann has been promoted to the position of executive vice-president at Microdata Corp., a subsidiary of McDonnell Douglas Corp.

■

Tandon Corp. announced the following promotions of three new vice-presidents in manufacturing and marketing positions: **Steve Hasenmeier**, vice-president of manufacturing and engineering; **Hari Apte**, vice-president, Singapore operations; and **Michel Fremont**, vice-president of marketing. **Jack Reynolds**, former vice-president of marketing, has become vice-president of management systems. Also, two executives, **Leonard Landin** and **Paul D. O'Neill**, have resigned to pursue, noncompetitive personal interests.

■

Bill Brehm has been named executive vice-president and chief operating officer of Health Information Systems, Inc. (HIS). Mr. Brehm joins HIS after serving as managing director of McDonnell Douglas Automation Co.'s European operations.

■

John J. Kentrich has been appointed assistant to the president and director of finance at Kaypro Corp.

■

Tom Kirker was recently promoted to the position of executive vice-president at Racal-Vadic, Inc.

■

Joseph P. Hayes has been appointed vice-president of business development at RTC Systems, Inc.

■

Paul R. Robichaux has been promoted to executive vice-president and chief operating officer of Boole & Babbage, Inc.

■

Mike McCall, formerly general manager of Renex Corp., has been named vice-president at Control Concepts, a division of Pressarch, Inc.

■

Wayne Wahlenmaier has been named vice-president and general manager of the professional microsystems division of Fujitsu Microelectronics, Inc.

■

William Kernion has been promoted to director of operations for Zilog, Inc.'s General Systems Division.

■

Rita Macari has joined Informatics General Corp. as director of oper-

See EXEC page 68

SUPERSHORTS

Harris Corp. announced its subsidiary, **Harris Systems Ltd.**, will build a plant in Irvine, Scotland to manufacture private branch exchange systems for the UK telecommunications industry.

■

TRW, Inc. has established a new operating group. The Information Systems group, part of TRW's Electronics & Defense Sector, will be headed by R.D.C. Whilden, an executive with more than 25 years' service with TRW. At a meeting of TRW's board of directors, Whilden was named an officer of the corporation.

The group will initially include TRW divisions providing commercial and consumer credit information services, real estate information services and computer and electronic equipment maintenance.

■

AT&T Information Systems announced it has signed a contract with **Aregon International Ltd.**, London, to develop a comprehensive, multipurpose videotex software package. The new videotex software, to be known as AT&T IVS-5, will support a variety of computer-based information services and related communications services for business and consumer markets.

■

Daewoo Telecom Co. Ltd. reported that it has signed a technology-transfer agreement with **Northern Telecom Ltd.** to manufacture optical fiber cable and transmission systems. Under the agreement, Daewoo will manufacture Northern Telecom's optical fiber transmission systems in Korea to be used in the commercial telecommunications market.

■

Mannesmann Tally Corp. and **Printronix, Inc.** jointly announced a settlement of their recent patent litigation. Under terms of the settlement, the MT-630, MT-660 and MT-690 printers will continue to be manufactured and sold by Mannesmann Tally.

Mannesmann Tally, without admitting infringement or validity of Printronix's patents, will pay Printronix an undisclosed sum of money for each printer sold. In addition, Mannesmann Tally has granted Printronix a license to certain of its patents.

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DP Directors: How To Cope With PCs In Your Organization
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The IBM Family Tree
IBM Market Domination
PCs In The Corporate Suite
Value Of The Corporate PC In A Standalone Mode

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COMPUTER INDUSTRY

EXEC from page 87

ations for the professional software services division.

■

Stanley J. Sewall has been promoted to group executive in research and development at Cincom Systems, Inc.

■

Robert J. Hanks has been named president and chief executive officer of Ambi Corp.

■

Alex N. Beavers Jr. was named president of Applicon, Inc., replacing **Donald W. Pedderson**, who resigned to pursue other interests.

■

Wing F. Chung has been appointed president and chief executive officer of Action Computer Enterprise, Inc.

Monchik-Weber Corp. has named **Leon Williams** as president and **Thomas J. Jordan** as chairman of the company. Jordan and Williams will have joint executive responsibilities for the daily and strategic operations of Monchik-Weber. In addition, both executives have been elected to the board of directors.

In a related move, **John Weber**, who earlier sold 200,000 shares in the company to an investor group, has resigned from his position as an officer of the firm. He will remain on the board of directors as well as on the executive committee.

■

Horace G. McDonell has been designated chief executive officer of Perkin-Elmer Corp.

■

W. Douglas Hajjar, Genrad, Inc.'s senior vice-president and chief financial officer, has been promoted to the newly created position of vice-president and chief operating officer. Hajjar will continue to report to **William R. Thurston**, Genrad's president and chief executive officer.

■

Jerome Carlson will join Triad Systems Corp. as vice-president and chief financial officer.

■

Jean M. Tellier has been appointed vice-president, program management, and **Michael S. McLagan**, vice-president, Region III international operations, at Datapoint Corp.

■

Tom Kirker has been promoted to executive vice-president at Racal-Vadic, Inc.

■

Richard B. Carlock has been promoted to executive vice-president of technical services at Information Solutions, Inc.

■

Joel Schwartz has been named vice-president for educational marketing for Digital Equipment Corp. He will report to Edward A. Kramer, vice-president, group manager, technical products.

■

Bruce W. Brown has been appointed vice-president of marketing at Encom Corp. and president of Encom International, Inc.

■

John Hamill has been named vice-president and general manager of systems manufacturing at Western Digital Corp.

■

Carl Champagne has been appointed vice-president of engineering at CGX Corp. Prior to joining CGX,

PORTABLE from page 73

current products. Frank Barbosa, general manager of Sharp Computer Corp., said, "Anybody buying a portable computer right now has to face inevitable trade-offs, whether it's limited keyboards and memory, an LCD screen that is hard to read or a dependence on ac current. We've still got a long way to go in this business."

Marie Spengler, president of Assisted Intelligence Design, Inc. of Palo Alto, Calif., said vendors targeting the portable mass market are "mere 'me-too-ists.' There is a vast demand for portable machines that incorporate value-added solutions," she said. "The structure of our industry precludes sameness. Too many companies are fighting to get onto Computerland's shelves, and there's just not enough room."

Alan Lefkof, vice-president of marketing at Grid Systems Corp. in Santa Clara, Calif., said, "There is no mass market in this niche. Successful vendors in this market have to dissect and target their users finely."

Many speakers and attendees agreed that software application programs written for specific vertical niches are the key to survival in the volatile battery-powered world.

Lisa Williams, president of STM Electronics Corp., said there is enormous potential for portables in vertical markets. Smaller firms must take advantage of vertical markets because they do not have sufficient advertising dollars to attract the mass-market customer, she added.

Paul Schuman, product manager of Businessland, Inc. in San Jose, Calif., said manufacturers have not resolved whether portables are used as primary or secondary computers. Indications are, he added, that 80% of today's portables are used as desktop devices.

Portables are increasingly moving toward IBM Personal Computer compatibility and standardized disk media, according to John Zepecki, director of software at Gavilan Computer Corp. in Campbell, Calif. "The question with IBM compatibility is how much compatibility can you get away with and still survive," he said.

Cmos memory, more advanced semiconductor chips (like Intel Corp.'s 80286) and improved displays, coupled with economies of scale manufacturing, will improve performance and drive costs down, making packages more attractive to consumers, Grid Systems' Lefkof said.

COMPUTER INDUSTRY

Champagne was a senior engineering manager for Digital Equipment Corp.'s computer special systems product group.

■

Frank Sagabiel has been named general manager at Nixdorf Canada Ltd.

■

Dan Beadle has been promoted to managing director, semiconductor operations for Europe, at National Semiconductor Corp.

■

David Nesmik has been named manager in the high technology industry group at the Boston office of Deloitte Haskins & Sells.

■

Roger Lee has been appointed chief financial officer, replacing Jean Deleage, at Vector Graphic, Inc.

Richard M. Jennings has resigned as vice-president of strategic planning and from the board of directors at Via Systems, Inc.

■

Gene Robinson has been elected president at Racal-Redac, Inc.

■

Marvin L. Crumb, president of Tally Corp., has resigned, effective immediately, to assume the posts of president and chief executive officer of Opcon, Inc.

■

James D. Atkins has been appointed president and chief executive officer at Spartacus Computers, Inc.

■

William B. Elmore joined Visual Engineering as president.

■

Charles E. Enevo has been named president and chief executive officer of Dystron Corp.

■

Ronald D. Fisher has been named president and chief operating officer at Interactive Systems Corp. Fisher was formerly vice-president of marketing for Visicorp of San Jose, Calif. Fisher will be replacing Thomas F. Cull, who will be leaving the company on Aug. 1 to form a new consulting firm.

■

Peter R. Strong has been elected to group vice-president, test and measurement, at Gould, Inc. and is responsible for the company's electronic instruments operations.

■

Malcom R. MacPherson has been appointed vice-president and chief operating officer at Seeq Technology, Inc.

Bernard S. Appel has been named president of the Radio Shack division of Tandy Corp.

■

Austin Vanchieri has been appointed to president of Diablo Systems, Inc.

■

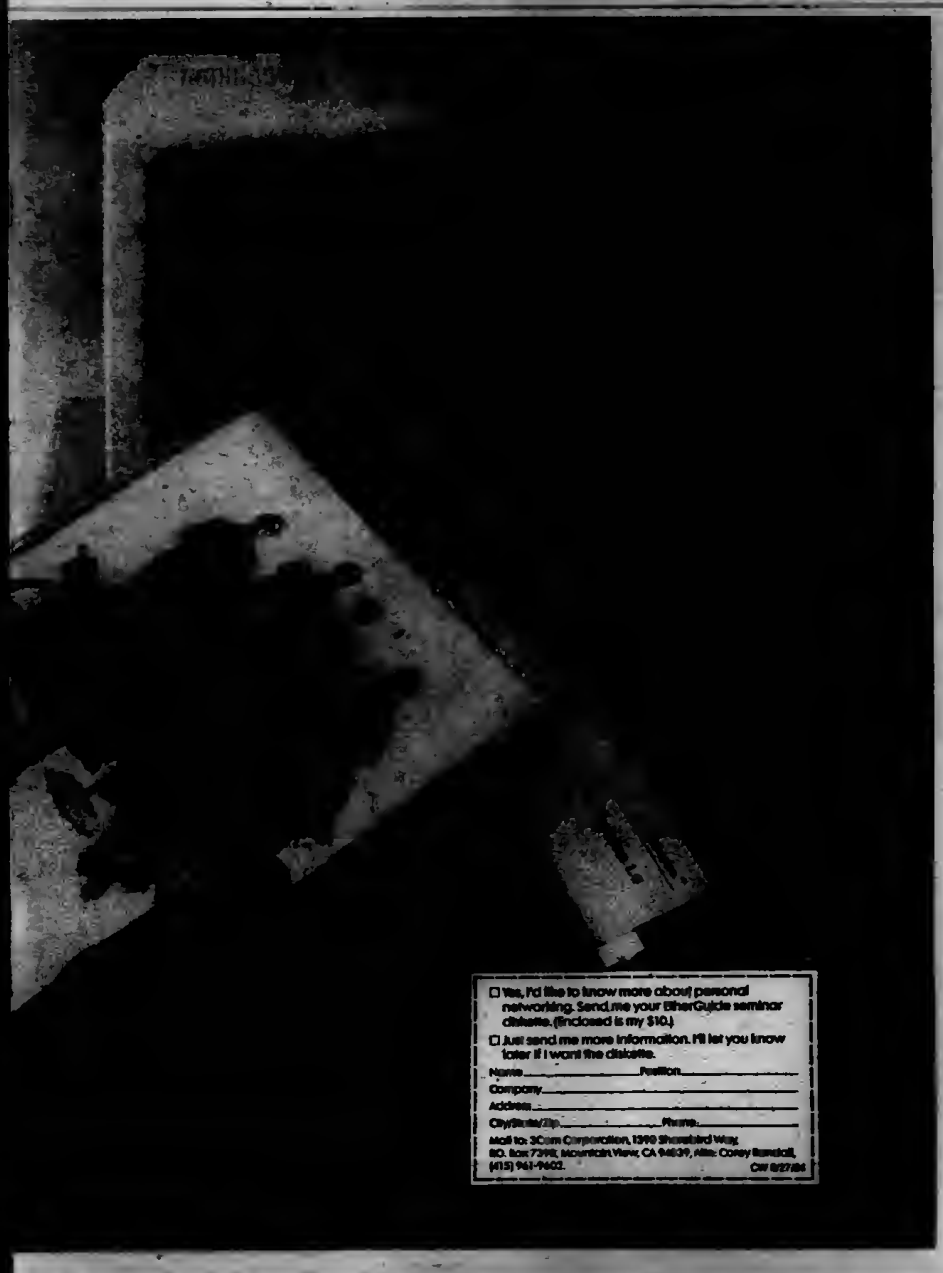
Alphacom, Inc. announced the appointments of **Doug Erhardt** as vice-president of finance and chief financial officer and **John Hahn** as director of product marketing.

■

Abraham Brand has been elected executive vice-president of Computer Memories, Inc.

■

Fortune Systems Corp. has announced that **Homer Dunn**, vice-president of planning, and **David Van Den Berg**, vice-president of sales, have resigned.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CW 8/27/84

IBM from page 73

formation on 370 CPU-to-software interfaces. Since the token-ring local-area network will have a planned interface to 370 applications, it seems certain the token-ring local-area network will require a software interface to 370 CPUs.

Obviously, with no product on the immediate horizon, there can be no interface information with which competitors can begin to develop alternative products.

But IBM's policy, most industry participants seem to agree, is to offer over the next few years piecemeal implementations of various components that will tie into its token-ring local-area net. IBM seems to be saying that a comprehensive net will only exist when the firm is good and ready to fit in the last piece — the mainframe interface — of what seems to be a product of many pieces.

In effect, IBM is telling users of a product that in its final form will be ready in two to three years; yet, it is already selling the essential peripherals required for a comprehensive local-area net. Theoretically, by the time IBM announces the mainframe interface, users may already have acquired the various other components of the local-area net, a fait accompli that would effectively slam shut the traditional window of opportunity for plug-compatible vendors.

TAXES from page 73

to the board of an FSC.

The third test is that the FSC must be able to show it performs certain activities outside of the U.S., such as soliciting orders and negotiating sales and contracts.

The final test, and perhaps the most difficult to prove, Yost noted, is that the firm must be able to show that more than 50% of expenses related to FSC sales were incurred outside the U.S.

Under the new tax provisions, the FSCs will themselves be subject to U.S. taxation, Yost said; previously, taxes related to Disc activities had been accrued on parent company accounts. Because of the deadlines written into the tax code, "we only have four months to understand how to set up an FSC," Yost said. While the U.S. Department of the Treasury might be expected to issue provisional rules to make the transition easier, that has not always been done in the past, he said.

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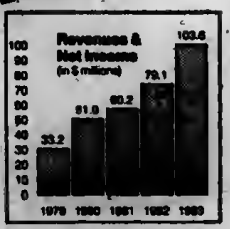

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Manages University-wide consulting offices which support mainframe, mini, and micro computers with a vast array of software. Responsible for two (2) (soon three) professional technical support people and over 70 students: Assisting students, faculty, and staff in designing, writing, and debugging programs, and using computers effectively. Also verifies programs and documentation. Also responsible for organizing students and professionals into a team that can deliver consistently high quality user support for complex ever-changing hardware and software. Must select, schedule, train, and take care of these 70 bright students so that they are able to provide long hours of good service for students, faculty, staff, and commercial customers.

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LITERARY AND TEXT ANALYSIS

Individual needed with advanced training in the humanities and with basic programming skills that include familiarity with package programs such as the Oxford Concordance Program, SCRIPT and SPIRES. Provides support to individuals interested in using the computer for literary analysis of machine-readable texts and therefore requires an individual to serve as a resource for locating both text and programs as well as for assisting in their use.

DOCUMENTATION SPECIALIST

Writes documentation explaining use of both hardware and software. Includes online documentation, user's guides, and reference manuals for beginning users, technically sophisticated users, and curious visitors. Assists programmers with program documentation. Edits documentation supplied by vendors. Verifies accuracy of documentation by testing. Prepares articles for newsletter and Princeton Weekly Bulletin. Prepares documents for printing or typesetting and oversees printing and distribution.

Must have excellent command of written English to prepare technical material in clear, concise form. Requires technical editing skills to deal with material not always familiar to the editor; a general understanding of computer functions and terminology; knowledge of editing techniques, document styles, typesetting terminology, and familiarity with document preparation systems.

Send resume including salary history and requirements to:

John R. Piggott

Princeton University Computer Center

87 Prospect Avenue, Princeton, NJ 08544

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PATIENT ACCOUNTING SYSTEM SENIOR PROJECT ANALYST

We have just completed implementation of the initial phases of the most innovative patient billing system in the hospital industry. This new Patient Accounting System is a component of our integrated online hospital information system consisting of 20 major applications. We need an individual who can organize and direct a project team in the remaining design and implementation phases of this management information system application. The ideal candidate will have five-plus years experience in design and implementation of large integrated online customer information systems. The candidate will also have managed four or more people utilizing sophisticated project management and development methodologies.

We have a dedicated MVS/XA shop with DOS-DL/I operating on dual IBM 3081-D computers. Our IDX terminal network supports a wide variety of applications developed using IBM's Patient Care System. We are located in a small midwestern city which enjoys the recreational, educational, and cultural advantages of a large university.

If you meet the above qualifications and would like to work in an up-to-date DP environment, please send a resume and salary history to:

Nancy Dyer, Information Systems Department
University of Iowa Hospitals & Clinics, Iowa City, Iowa 52242

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CORPORATE INFORMATION SYSTEMS MANAGER

A major firm in the Southeastern United States seeks a Corporate Manager of Information Systems. Applications are primarily scientific but include administrative applications as well.

Candidate for this key department position must have indepth experience with DEC hardware, appropriate systems software and applications software. Candidate must also be experienced in CAD applications. Position requires BS in Computer Science or equivalent experience, with 10+ years experience in a multiple computer multi-user environment with multiple language skills, and minimum 2 years supervisory experience.

Successful candidate will be responsible for all information systems applications in the company and the supervision of the department.

Our firm offers competitive salary and fringe benefits. Send your resume, in confidence, to:

CW-B4056
Computerworld, Box 880
Framingham, MA 01701
EOE M/F

Data Processing

SYSTEMS ANALYSTS

Automation and Control Systems Engineering

As a growing subsidiary of Atlantic Richfield, Four Corners Pipeline offers the challenge and recognition of a well established company on the move. We currently have openings for Systems Analysts at our Long Beach location.

Positions involve heavy real-time systems analysis and assembly language programming on DEC PDP 11 computers under RSX 11M. Major responsibilities include supervisory control system related troubleshooting, software maintenance, software development and implementation, consulting and planning activities for oil pipeline systems. Other responsibilities include computer hardware installation support, system documentation, user training and development of preliminary and detailed software specifications. Positions require handling multiple projects.

Degree or equivalent in computer science, engineering, mathematics or other science preferred with 2+ years experience in on-line, real-time control/monitoring systems. Applicant must be a self-starter with good oral and written communication skills. Must also be flexible and have good interpersonal skills.

We offer an excellent salary/benefits package, unlimited advancement opportunities and a positive, growth oriented work environment. Please send your resume including salary history to Jackie Beckett, Employee Relations, Four Corners Pipeline Company, 5800 Cherry Avenue, Long Beach, CA 90805.

Four Corners Pipeline Company

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DIRECTOR OF INFORMATION PROCESSING SERVICES

PIERRE, S.D.

The State of South Dakota is seeking a seasoned administrator with at least 10 years of progressively responsible experience to manage our Information Processing Services Office which includes data processing, telecommunications, and office systems programs. With a staff of 100 this highly visible position coordinates information resources activities of many different state agencies. Applicants must have excellent oral and written communication skills and a detailed knowledge of state-of-the-art hardware and software products. Position requires demonstrated ability to plan for, acquire and implement automation in large, complex organizations. Send resume and salary requirements no later than October 1, 1984 to:

Jeff Stroup
Commissioner
BUREAU OF ADMINISTRATION
State Capitol
Pierre, South Dakota 57501

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SYSTEM PROGRAMMER:

B.S. in Computer Science. To analyze, develop, test and maintain real-time and batch system operations for energy and related industry, including hardware system design, data retrieval system and operations, security system, host/front end system in Computer Architecture, File Processing and Advanced Numerical Methods of 1 year [illegible] working experience in systems hardware and data retrieval systems design and implementation and operational scheduling system. $23,000/yr., 40-hrs. wk. Must bring transcript of experience letter to interview. Contact Texas Employment Commission, Houston, Texas or send resume to the Texas Employment Commission, T.E.C. Building, Austin, Texas 78778, Job Order No. 3560538. Ad paid by Equal Employment Opportunity Employer

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University teacher, Dept. of Math and Computing. Must have M.S. in computer science and 1 yr teaching exper. Riverside, CA area. $21,600 yr. plus benefits. Send this ad and resume to Job # 2509 P.O. Box 865, Sacramento, CA 95804 before 9/11/84.

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NEW ZEALAND = NEW OPPORTUNITIES

THE COUNTRY: The two islands which comprise New Zealand are situated in the southern part of the Pacific basin, some 1000 miles south east of Australia and approximately 12 hours flying time from Los Angeles. A country about the size of the state of Colorado, New Zealand enjoys an equable and temperate climate. With 3 million inhabitants, New Zealand offers open spaces, clean air and secure surroundings. There are ample opportunities to enjoy a wide range of year-round outdoor activities in this land of natural beauty.

THE COMPANY: Databank Systems Limited is New Zealand's largest non-government computer organisation with its primary function being to develop and operate computerised systems for all the country's trading commercial banks. In addition we have a substantial bureau operation, a nationwide distributed network which links 17 computer centres and hundreds of bank branches. The hardware includes 20 mainframes (ranging from IBM 3081 to IBM 4331 Group 2) together with numerous minicomputers and microprocessors. Development activities are concentrated in our Head office in New Zealand's capital city, Wellington.

THE OPPORTUNITIES: We seek to recruit thoroughly experienced staff in the following areas:

Senior Programmers
Analyst Programmers
Application Systems
4700 Software
IBM Assembler
CICS
COBOL

Systems Programmers
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PATHWAY
ACI/BASE 24 products
ACF/NCP and ACF/VTAM
SNA problem determination
MSNF
NGCF/NPDA etc

Systems Programmers
Systems Software
MVS/JES2
ACF2 SMP/E,
ACF/V10
ROSCOE, TSO/ISPF

Database Designers
Systems Programmers
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IMS, DB, DC or Fast Path experience
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RAMIS HOGAN
Umbrella, SAS and TANDEM would be advantageous

Project Leaders/
System Analysis/
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Specific experience with ON-LINE SYSTEMS. IMS, DB/DC.
Preference given to those with knowledge of HOGAN, Umbrella HOGAN Products and/or Information Engineering techniques

We will be pleased to consider applications from those interested in emigrating to New Zealand. We will also consider a limited number of short-term contracts.

We offer a generous relocation package with attractive salary and benefits according to the terms of employment. A senior representative of Databank Systems will be visiting major cities throughout North America in October and November 1984 to conduct interviews for the above positions.

If you are definitely interested and have the requisite qualifications, please airmail personal and employment details together with contact telephone numbers to:

The Recruitment Officer
Databank Systems Limited
PO Box 3647
Wellington, New Zealand
Telephone 64-4-736-978

NOTE: Applications for this series of interviews close on September 30th, 1984, but we are interested in hearing from candidates for future employment.

Databank SYSTEMS LIMITED

INTERACTIVE VIDEO DISC SENIOR MARKETING PROFESSIONAL

Digital Equipment Corporation is looking for a strategic marketer to develop the marketplace for Digital's new IVIS product. IVIS is Digital's interactive video disc training/information system and is the highest quality product of its kind available today. It is likely to dominate the market for high-functionality systems.

You will be responsible for establishing IVIS as the product of choice with OEM's, courseware developers and other points of marketing leverage.

To qualify you will need a background in high technology marketing, account management and strategy formulation including at least 5-10 years experience marketing high technology, computer application or video disc products. Strong negotiating skills and executive presence are a must. An advanced degree is preferred.

Digital offers a comprehensive benefits package including medical/dental insurance plans, stock purchase plan and tuition reimbursement.

If you are interested and qualified please send your resume, including salary history to: **Charlee Berbenti, Digital Equipment Corporation, Dept. 0827 3904, 40 Old Bolton Road, Stow, MA 01775.**

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Challenging senior opportunity responsible for system design, programming, and operation of data processing function for entire organization. Requires 5+ related data and 4 years experience in computer operations, operations programming and data/telecommunications projects. At least 2 years of project and personnel supervision. Equivalent or additional experiences may be substituted for a degree. Participation in relocation process is desirable. Salary negotiable between $1007 and $1302 bi-weekly, excellent benefits. Make application to Promo City Personnel, P.O. Box 1848, Provo, UT 84601 by September 30, 1984.

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We are a well respected consulting group with about 280 employees. For the past 13 years, we have been providing a wide variety of services in the fields of management, organisation and data processing on behalf of important clients in West-Germany and abroad. Within the field of EDP, especially system consultancy, we belong to the leading companies in Europe. We are now considerably expanding our Systems Consulting Section and are therefore offering opportunities for System Specialists to handle interesting and demanding system-related assignments using IBM equipment (Ref: 109).

You should have the following qualifications:

- sound theoretical training with an academic degree or equivalent in mathematics, computer science or engineering
- wide experience in system programming and generation
- practical experience in installation and management of DB/DC systems
- detailed knowledge and several years of experience in one of the following fields:
  - Networks, especially SNA and VTAM
  - MVS system programming and tuning
  - DOS/VSE system programming and tuning
  - Migration: DOS to MVS
  - Data communications, especially CICS
  - Capacity planning
- good knowledge of English and at least basic German

Successful candidates will not only have the necessary professional experience, but also the ability to apply their particular experience as skilled consultants. They will also need flexibility, willingness to expand their professional knowledge, as well as the drive and ability to work as team members.

We are offering competitive salaries and results-oriented bonuses. Please write, quoting the above reference, and enclosing all relevant credentials. For further information contact Mr. Tuechter. Tel.: Cologne: 0221/798091(-95).

All applications will be treated confidentially.

INC AG, Raderberger Straße 182
5000 Köln 51, W.-Germany

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ENVIRONMENT consists of IBM 3084, 3081, and 4341 supporting large scale IMS development projects, scientific and business applications.

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- As a member of the power systems planning team you will be directly involved in program development and ongoing support to the Power System Planning Group. Programs used by this group are for planning future transmission and generation.
- Requires BSEE degree and minimum 2 years experience in application and program development.

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- Requires previous experience in scientific applications with a sound knowledge of PL-1 or Fortran. Computer applications development with exposure to a VM operating system would be helpful.

SYSTEMS PROGRAMMERS

- (IMS or CICS) Responsible for New Release Installation, Problem Resolutions and System Tuning. Experience in IMS DB/DC.
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- Requires a background in H/S capabilities, Applications Development and Analysis, Equipment Evaluation and Computer Cost Studies.

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AMERICAN EXPRESS, a leader in the financial services industry, has an immediate opportunity for a Performance and Tuning Specialist in our Tech Support Department.

This position functions in a state-of-the-art environment with IBM 3081/84 and MVS/XA. Qualified candidates should possess experience in the performance and tuning of MVS/XA operating systems in a large scale, multiple IBM mainframe environment. Your knowledge of MVS must be extensive, and you should be familiar with IMS [illegible] systems or other large scale, multiple IBM mainframe environment. Knowledge of MICS and SAS is desirable.

AMERICAN EXPRESS is a fast track, aggressive corporation that will demand the maximum of your capabilities. In return, we will provide an excellent salary that will keep pace with your rapid growth. In addition, a comprehensive relocation package will be provided.

If you believe you have the ability to be part of our number one Tech Support team, please submit resume including salary history in confidence to Rick Webb.

ONLY APPLICANTS POSSESSING SPECIFIED QUALIFICATIONS WILL BE CONTACTED.

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We currently have an opening for someone with experience in a large IBM CICS installation as a systems programming manager. Broad communications network background and ACF/VTAM experience are important.

In addition to technical expertise, the successful candidate should have excellent interpersonal skills to augment his/her management experience. Responsibilities include managing 3 systems programmers in an IBM 3081 MVS/XA environment.

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MANAGER

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Right now, we are seeking an innovative manager to direct a group of highly skilled professionals who are developing file system, communications, and kernel operating systems software for fault tolerant, highly available systems.

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To explore this position, located in our beautiful Research Triangle Park facility, send your resume with salary history to: Mr. John Bushfield, Data General Corporation, Box CW-827, 62 T.W. Alexander Drive, Research Triangle Park, NC 27709. Investing in people to make equal opportunity employment a reality.

*UNIX is a trademark of AT&T, Bell Laboratory

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COMPUTER SCIENTIST

is needed for job entailing the design and development of a network server's software system including internetwork gateways. Other duties will include the design and development of a distributed data base system utilizing a local area network. Knowledge of network layered architecture, data base technology, and local area networks in design, performance, protocols, and access techniques are required. This background could be developed in a Master's program in Computer Science. Candidates must have a M.S. Degree in Computer Science. Working hours: 8:00 a.m. - 4:45 p.m., Monday - Friday. Salary, $2,916.83 per month. Applicants should send their resumes to Michigan Employment Security Commission, 7310 Woodward Ave., Room 415, Detroit, Michigan 48202. Reference #27764. An Employer Paid Advertisement.

SYSTEMS ANALYST

IDMS and ADS-O analyst with minimum 5 years COBOL and online development experience. Insurance industry. Must be people and business oriented. Rapidly growing IBM 4341, VM/370, DOS/VSE shop. Send resume and salary history requirements to:

VP MD
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The University of Virginia has an opening for a Senior Programmer/Analyst with knowledge of Micro Computer Hardware and Software and Industrial and Human Factors Engineering Methodology. Apply by September 21st, 1984 to

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Department of Personnel Administration, Post Office Box 9027, 1001 North Emmet Street, Charlottesville, Virginia 22906

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Sr. Scientific Analysts — The positions require individuals with 3 to 5 years of experience in one or more of the following: development of structure activity relationships, computational chemistry, chemical graphics, applied statistics, chemical data management, instrument interfacing and laboratory information systems. An advanced degree in the physical sciences. VAX/VMS experience and FORTRAN experience preferred.

Data Base Analyst — 3 or more years' data processing experience with a working knowledge of IMS DB/DC and either COBOL or assembler, as well as IMS backup/recovery utilities.

Sr. Systems Analyst — 5+ years' experience in the design and implementation of manufacturing financial or marketing systems in a large IBM mainframe environment. Experience in MRP II is a plus.

Programmers — Excellent advancement opportunities for people with 2+ years in OS/MVS, COBOL, TSO/SPF or DOS/VSE and CICS/DL I in programming complex business, financial and marketing systems.

OS/MVS Systems Programmer — 3-5 years of solid MVS operating system support experience, including system generation, maintenance (SMP4) and program product installation. A good knowledge of TSO, ISPF, ACF/VTAM and SAS is preferred, with exposure to either IMS/VS, or CICS/VS a definite plus

ICI Americas (sales of over one billion in '83) is the U.S. subsidiary of a major multi-national corporation. These positions are located at our corporate headquarters, a campus-like complex in suburban Wilmington, DE. ICI offers salaries fully commensurate with the required experience, excellent benefits including a generous relocation policy and ample growth opportunities. Delaware, "the small wonder" state, offers cosmopolitan living without the high costs and other drawbacks of big city living. Why not invest 20 cents in your future by sending your resume including salary requirement, in confidence, to:

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Software Engineers

To qualify, you must be able to design and develop sophisticated real-time software in the areas of data base management, interactive color graphics, distributed real-time processing, networking and high-speed data acquisition. You will use the most modern software development tools available on DEC VAX/VMS systems. You will need at least 3 years' experience in assembly language systems programming including operating systems services. Experience in operating systems internals, IO device drivers or time critical real-time software is essential. A solid background in DEC VAX/VMS, HP 1000/image or Tandem is preferred.

Senior Engineers/Power Plants

To qualify, you will need 6 or more years' experience in power plant operations, mathematical modeling, and computer simulation control of nuclear and fossil power plants. An advanced degree in an engineering discipline, or equivalent, required; on-line/real-time programming background desired. Positions involve significant client contact and technology development.

Systems Engineers

To qualify, you will need to be an experienced software engineer to work in our Systems Engineering Department. Assignments will include development of system requirements, test plans and procedures, system integration, and participation in design reviews for real-time integrated hardware/software systems. You will need at least 4 years' applicable experience with a BS degree in Engineering, Computer Science, or equivalent, required.

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To qualify, you will need a minimum of 2 years' applications programming experience working on DEC 1124, 1134, or 1144 systems including experience with RSX 11 Operating Systems. Experience with DEC Macro, C, or FORTRAN is also desirable. A BS degree in Electrical Engineering, Physics, or equivalent, required.

We offer a highly competitive salary/benefits package including a stock program, liberal relocation and the opportunity for rapid career advancement through increasingly responsible assignments. To apply, please send your resume to: **Systems Control, Inc., 1801 Page Mill Road, Palo Alto, CA 94304. Attn: Professional Employment Dept. CW-827.** An equal opportunity employer m/f/h/v.

SC SYSTEMS CONTROL, INC.

Programmer

Will assist with the development of an on-line corporate materials management system composed of purchasing, material control, and financial sub-systems. Requires a Bachelor's degree in Computer Science or related field and one year programming experience using an IBM 3083 with IMS/DB/DC, MVS, MFS, Cobol, SPF, PANVALET, JCL.

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Wm. Glen Brown
Employment Supervisor
Santee Cooper
P.O. Box 398
Moncks Corner, S.C. 29461

Equal Opportunity Employer

DATA BASE SPECIALIST

Joy Manufacturing Company is seeking an individual to perform the duties of data base specialist in our management information systems department.

The successful candidate will work with all phases of IDMS data base management system software including installation, customization, testing, implementation and operation of the system.

Qualifications - a degree or equivalent in computer science or a related field is desirable. A minimum of 2 years working experience with Cullinet Inc.'s IDMS data base management system. Minimum 1 year experience in data base administration of IDMS central version system on IBM 4341 or equivalent mainframe CPU using DOS/VSE. Minimum 2 years experience in manufacturing data base applications (MRP, etc.).

Please forward resume with current salary to:

Joy Manufacturing Company
Manager of Salary Employment
139 Liberty Street
Franklin, PA 16323

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Data Processing

RELOCATION TO ATLANTA OPPORTUNITIES IN HIGH TECH IBM/BURROUGHS ENVIRONMENT

The FEDERAL RESERVE BANK OF ATLANTA provides wholesale banking services and support for advanced economic research and analysis. We have immediate openings for an IMS Systems Programmer, a Burroughs Programmer, a Systems Analyst II, an IMS DB/DC Applications Programmer, an Operations Analyst, and a Data Base Analyst. Here is a solid base on which you can build a future.

We seek career oriented individuals to fill the following positions.

IMS SYSTEMS PROGRAMMER
$25,000 - $33,000

with 1 + years experience supporting IMS DB/DC in an MVS environment. Experience with ISC, DC Monitor and IMS PARS a plus. Supervisory experience helpful, since the incumbent will eventually be in charge of a staff.

BURROUGHS PROGRAMMER
$20,000 - $25,000

with 2-3 years experience Burroughs programming in a medium system environment. Strong COBOL required and exposure to Forms II and DMS I/II helpful.

SYSTEMS ANALYST II (IMS DB/DC)
$24,000 - $25,000

with 3-6 years experience in an MVS environment conducting automated systems studies for user departments, designing systems and providing specs for development. Strong experience in IMS DB/DC programming with exposure to JCL, Panvalet, COBOL, TSO/SPF, MPS and BTS.

IMS DB/DC APPLICATIONS PROGRAMMER
$22,000 - $27,000

with 1-3 years experience in MVS, JCL, PANVALET, COBOL, TSO/SPF and Dialogue Manager and IMS DB/DC including MPS and BTS. Experience with Assembler and IBM PC programming helpful.

OPERATIONS ANALYST
$22,000 - $26,000

with 2-3 years experience evaluating hardware and software acquisitions, coordinating hardware and software implementations and performing data communications network analyses, cost analyses and work flow studies. Experience with MVS, INFOMGT., INFO II, IMS DB/DC, JCL, TSO/SPF, PANVALET, UCCI, ACF2, SAS and FOCUS desirable.

DATA BASE ANALYST
$22,000 - $25,000

with 1 + years experience in systems design and programming including some data base. Knowledge of IMS DB/DC and IBM Data Dictionary required.

Along with salary commensurate with experience, we offer top challenge, opportunities for growth and one of the most outstanding benefits packages available. Even better, the experience you'll gain with us is invaluable.

Make the right career choice!

For prompt, confidential consideration, please call Robert Stein collect at (404) 521-8774, or send your resume to:

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Atlanta, Georgia 30301-1731

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RPI

Academic Computing Consultants

The Office of Computer Services at Rensselaer Polytechnic Institute, located in Troy, NY, provides a variety of computing services in support of instructional and research activities. The computing center serves the University community with an IBM 3081D running the Michigan Terminal System (MTS) in a distributed environment of 800 terminals, personnel computers, and related network and computer services. We are seeking several talented individuals with strong technical skills to fill the following positions:

Software Consultant

Serve the user community of faculty, students, staff, and external users by consulting and teaching in our mini-course program. Expertise in Fortran, Assembler, Pascal, Cobol, APL and PL/1 are required along with strong interpersonal skills and consulting experience. Knowledge of data base languages VMS/VS, MTS, and UNIX are also highly desirable.

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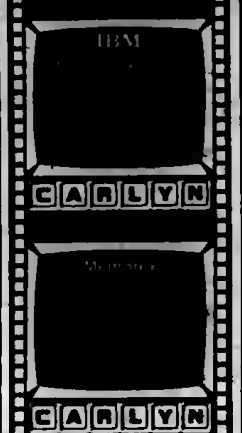

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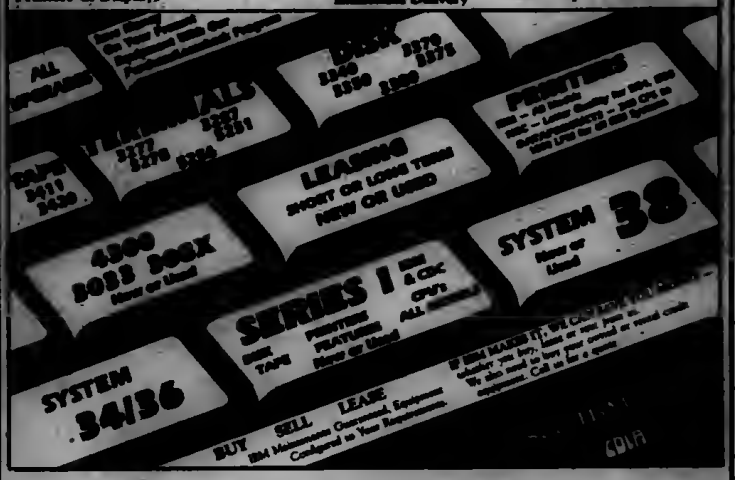

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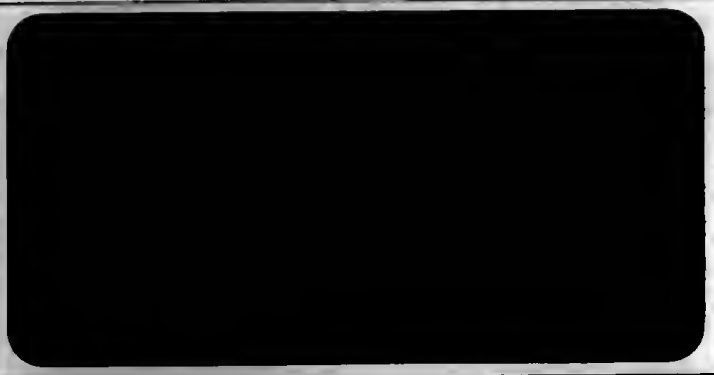

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(213) 485-2161
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Bid Closing Date: Oct. 16, 1984 @ 11 A.M.

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 568 Robert E. Lee Building, Jackson, MS 39201 for the following data processing equipment and services:

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Request for Proposal No. 945, due 3:30 p.m., Tuesday, September 11, 1984 for the acquisition of on-site maintenance for IBM word processing, System/34 and associated equipment on the campus of Holmes Junior College, Goodman, MS.

Request for Proposal No. 946, due 3:30 p.m., Thursday, September 20, 1984 for the acquisition of three turnkey hospital management systems for the State Elementary Developed Hospital Commission. Because of the bulk of the RFP, vendors must call or submit a written request for these specifications.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

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A pre-proposal conference will be held on WEDNESDAY, SEPTEMBER 5, 1984. Proposers are encouraged to attend. Proposal documents are available by mail at no charge and also open to public inspection in the Bureau of Purchasing and Materials Management at the above noted address. For further information, contact the Orlando City Purchasing Agent at (305) 849-2391.

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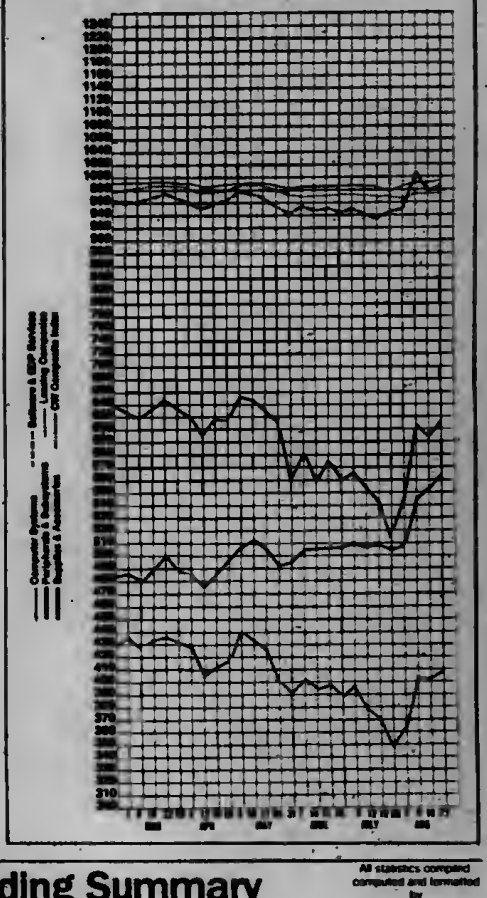
Computerworld Stock Trading Index



Computerworld Stock Trading Summary

All statistics compiled computed and formatted by TRADE QUOTES, INC Cambridge Mass. 02139

CLOSING PRICES WEDNESDAY, AUGUST 29, 1984.

COMPUTER SYSTEMS

	1983-84 HIGH	1983-84 LOW	CLOSE Aug 29	NET CHANGE	PCT CHANGE
ALPHA MICROSYSTEMS	9- 3/4	3- 7/8	3- 7/8	- 1/8	-3.0
ALTOS COMPUTER SYST	9- 1/2	6 3/8	7- 1/8	- 1/8	-1.7
AMDAHL CORP	74- 1/2	38 1/2	54 3/8	+1 3/8	+2.6
APPLE COMPUTER INC	74- 1/2	23	39	- 1/8	-0.3
AT&T	66- 1/8	53	58 1/8	- 1/8	-0.2
BURROUGHS CORP	61- 1/8	38 3/4	56 3/4	+1 1/4	+2.2
COMPUTER AUTOMATION	9- 3/4	2- 1/2	3- 1/8	- 1/8	-3.7
COMPUTER CONSOLES	13- 1/2	5- 3/4	7- 1/4	- 1/8	-1.7
CONTROL DATA CORP	73- 3/8	39 7/8	48	+1	+2.1
CONVERGENT TECHN.	16- 3/4	7- 1/4	11- 1/4	+1 3/8	+14.0
DIGI RESEARCH IND	39- 3/4	22 1/2	27 1/4	+2 1/8	+8.4
DIGITAL EQUIPMENT	95-1/2	63 1/4	93 3/4	+3 3/8	+3.7
ECCO INC	13- 1/2	4	4	- 1/2	-11.1
ELECTRONIC MEMO.	5- 1/8	1- 1/2	1- 7/8	- 1/8	-6.7
FLEXIBLE MFRG SYST	13- 1/4	5- 1/2	5- 3/4	- 1/4	-4.3
FOXBORO CO	39- 1/2	19 1/2	19 3/4	- 1/4	-1.3
GENERAL AUTOMATION	7- 1/2	2 1/2	3 1/2	- 1/8	-3.5
GRID INC	24- 1/4	14 3/4	15	+1 1/4	+9.0
HONEYWELL INC	73- 3/8	39 3/4	59	- 3/4	-1.2
HEWLETT-PACKARD CO	91- 1/2	58	88 1/2	+1 1/2	+1.7
HONEYWELL INC	63- 1/8	39	54 1/2	+1 1/4	+2.3
IBM	129-1/4	94 1/4	124 1/2	+2 1/4	+1.8
IPL SYSTEMS INC	3- 1/4	1- 1/2	2	- 1/8	-5.9
M/A-COM INC	13- 3/4	5- 3/4	5- 3/4	+1	+9.5
MANAGEMENT ASSIST	9- 1/2	3- 1/2	3- 1/2	- 1/2	-12.5
MATHEMATICS SCIENCE	9- 1/2	5 1/2	7- 1/4	- 1/4	-3.3
MICROLAB COMPUTER SYS	9- 1/2	3 1/2	3 1/2	- 1/4	-6.7
MICRONET DATA SYS	3- 1/2	1- 1/4	1- 1/4	- 1/8	-9.1
MOTOROLA INC	70- 3/8	43 1/2	63 1/2	+3 1/2	+5.8
NAT'L SEMICONDUCTOR	17- 1/2	8 1/2	14 1/2	+1 1/2	+11.5
NBI INC	17- 1/2	3- 5/8	3- 5/8	- 1/8	-3.3
NCR	73- 3/8	39 3/4	59 1/4	- 1/4	-0.4
PERKIN-ELMER	18- 3/4	10 1/2	10 3/4	- 1/4	-2.3
PRIME COMPUTER INC	11- 3/8	7 3/4	8 1/4	- 1/8	-1.5
QUASAR COMP	3- 1/2	1- 1/2	1- 1/2	- 1/8	-7.7
TANDON CORP	3- 1/2	1- 1/2	1- 1/2	- 1/8	-7.7
TANDY CORP	31- 1/2	19 1/2	19 1/2	- 1/2	-2.5
TELEVIDEO SYSTEMS	4- 1/2	2 1/8	2 1/2	- 1/8	-4.8
TELXON CORP	5- 1/8	1- 1/2	1- 1/2	- 1/8	-7.7
TEXAS INSTRUMENTS	164-1/2	108 1/2	145 1/2	+2 3/4	+1.9
ULTIMATE CORP	15- 1/4	8 3/4	9 1/2	+1 1/8	+13.4
VECTOR GRAPHICS INC	11- 1/2	4	4	- 1/4	-5.9
WANG LABS "A"	39- 1/2	20 1/2	20 1/2	- 1/2	-2.4
WANG LABS "B"	39- 1/2	20	20 1/2	- 1/2	-2.4
WANG CORP	39- 3/8	20 3/4	20 3/4	+1 1/4	+6.4

LEASING COMPANIES

BOOTHE FINANCIAL CP	16- 3/8	8 1/2	8 1/2	- 1/8	-1.4
COMDISCO INC	16- 3/4	10 3/4	10 3/4	- 1/4	-2.3
CONTINENTAL INFO SYS	9- 3/8	5	5	- 1/8	-2.4
DPF INC	3- 1/4	1	1	- 1/8	-11.1
PHOENIX AMERICAN INC	9- 1/2	7	7	-	0.0
SELECTRO INC	11- 3/4	7 1/2	7 1/2	- 1/8	-1.6
U.S. LEASING	39- 1/2	20 3/4	21 1/2	- 1/2	-2.3

COMPONENTS

ADVANCED MICRO DEV	39- 3/4	20 1/2	20 1/2	+2 1/2	+6.7
INTEL CORP	15- 3/8	8	8	- 1/4	-3.0
ANALOG DEVICES INC	39- 3/8	22 3/4	22 3/4	+1 3/4	+8.3
ZILOG INC	39- 1/4	12 3/4	13	- 1/4	-1.9
APPLIED MATERIALS CO	9- 1/2	4 1/2	4 1/2	- 1/2	-9.0
TEKTRONIX	39- 3/8	21 3/4	21 3/4	0	0.0

EXCHG CHANGE TICKR1 S=NASDAQ/OTC; P=PACIFIC S=BOSTON1
L=ADDITIONAL COMMENTS1 O=OVER-THE-COUNTER
6-7-C SOLDIO SEN 210 PDIC=P 30 30 0 P.R. 00 LAST DIO
111 30 NEAREST DOLLAR

SOFTWARE & EDP SERVICES

	1983-84 HIGH	1983-84 LOW	CLOSE Aug 29	NET CHANGE	PCT CHANGE
COMMODORE COMP CORP	19- 3/4	8	8 1/2	- 3/4	-8.1
COMPUTER SYSTEMS INC	11- 3/4	6 1/2	10	- 3/4	-6.9
DAC COMPUTERS INC	11- 3/4	6	12 1/2	-	-7.3
DATAPOINT CORP	39- 1/2	20	20 3/4	- 1/4	-1.2
DATAPRODUCTS CORP	9- 1/2	3 1/2	3 1/2	-	0.0
DATAVISION INC	3- 1/2	1 1/8	1 1/8	- 1/8	-10.0
DIGITAL SYSTEMS	3- 1/2	1 1/8	1 1/8	- 1/8	-10.0
ELECTRONIC DATA SYST	44- 1/2	26 1/2	44 1/2	+1 1/2	+3.5
ELECTRONIC SYSTEMS	9- 1/2	3 1/2	3 1/2	- 1/8	-3.5
GENERAL AUTOMATION	7- 1/2	2 1/2	3 1/2	- 1/8	-3.5
GENERAL DATACOMM	7- 1/2	2 1/2	3 1/2	- 1/8	-3.5
GERBER SCIENTIFIC	9- 1/2	4 1/2	4 1/2	- 1/8	-2.7
GRAPHIC SCIENCES	7- 1/2	3 1/2	3 1/2	- 1/8	-3.5
GTE COMPUTER SYSTEMS	9- 1/2	3 1/2	3 1/2	- 1/8	-3.5
HYTHRONIC CORP INC	3- 1/2	1 1/2	1 1/2	- 1/8	-7.7
INFORMATION SCIENCE	3- 1/2	1 1/2	1 1/2	- 1/8	-7.7
INTERGRAPH CORP	9- 1/2	3 1/2	3 1/2	- 1/8	-3.5
KEANE ASSOCIATES	9- 1/2	3 1/2	3 1/2	- 1/8	-3.5
LOGICON	39- 1/2	20 1/2	20 1/2	- 1/2	-2.4
MAI COMPUTERS	3- 1/2	1	1 1/8	- 1/8	-10.0
MANAGEMENT SCI AMER INC	11- 1/2	6	6	- 1/8	-2.0
MATHEMATICA APP GRP	3- 1/2	1 1/2	1 1/2	- 1/8	-7.7
MICRO DATA BASE SYS	9- 1/2	3 1/2	3 1/2	- 1/8	-3.5
MICRO-MATIC CP	3- 1/2	1 1/2	1 1/2	- 1/8	-7.7
NATIONAL DATA CORP	39- 1/2	20 1/2	20 1/2	- 1/2	-2.4
ON-LINE SOFTWARE INT	9- 1/2	3 1/2	3 1/2	- 1/8	-3.5
PANAMETRIC SYSTEMS	9- 1/2	3 1/2	3 1/2	- 1/8	-3.5
PLANNING RESEARCH	19- 1/2	11 1/2	11 1/2	- 1/2	-4.2
POLICY DATA SYSTS CP	7- 1/2	3 1/2	3 1/2	- 1/8	-3.5
PROGRAMMING & SYS	3- 1/2	1 1/2	1 1/2	- 1/8	-7.7
REYNOLDS & REYNOLD	39- 1/2	20 1/2	20 1/2	- 1/2	-2.4
SCI GEN	9- 1/2	3 1/2	3 1/2	- 1/8	-3.5
SHARED MEDICAL SYST	39- 1/2	20 1/2	20 1/2	- 1/2	-2.4
SYNTRONIC SERVICES	3- 1/2	1 1/2	1 1/2	- 1/8	-7.7
SYSTEMS INC	9- 1/2	3 1/2	3 1/2	- 1/8	-3.5
UNI CORP	7- 1/2	3 1/2	3 1/2	- 1/8	-3.5
UCCEL	19- 1/2	11 1/2	11 1/2	+1 1/4	+10.8

PERIPHERALS & SERVICERS

3D INTERNATIONAL	3- 1/2	1	1 1/8	- 1/8	-10.0
ADDITRON ASSOCIA	3- 1/2	1 1/2	1 1/2	- 1/8	-7.7
AUTO-TROL TECHNOLOGY	19- 1/2	11 1/2	11 1/2	- 1/2	-4.2
CENTURY DATA COMPUTER	3- 1/2	1 1/2	1 1/2	- 1/8	-7.7
CONCORD INC	3- 1/2	1 1/2	1 1/2	- 1/8	-7.7
DIGITAL INT'L	7- 1/2	3 1/2	3 1/2	- 1/8	-3.5
DOLLY CORNER D MFR	7- 1/2	3 1/2	3 1/2	- 1/8	-3.5
GRACE CORP	3- 1/2	1 1/2	1 1/2	- 1/8	-7.7
OPTIMIZED COMP CORP	9- 1/2	3 1/2	3 1/2	- 1/8	-3.5
QUINN CORP	9- 1/2	3 1/2	3 1/2	- 1/8	-3.5
SYNTRONICS	3- 1/2	1 1/2	1 1/2	- 1/8	-7.7

COMPUTER SERVICES INC 1- 1/8 1 7/8 0 0.0
COMPUTER TRANSACTION 3- 1/2 1 3/4 0 0.0
COMPUTERVISION CORP 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
COMRAC CORP 11- 1/2 6 1/2 6 1/2 - 1/2 -7.1
CONSISTENTS CORP 11- 1/2 6 1/2 6 1/2 - 1/2 -7.1
DATAPOINT CORP 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
DATA SWITCH CORP 9- 1/2 3 1/2 3 1/2 - 1/8 -3.5
DATUM INC 19- 1/2 11 1/2 11 1/2 - 1/2 -4.2
DIGITECH COMP CORPOR 19- 1/2 11 1/2 11 1/2 - 1/2 -4.2
DIGITAL OLIVETTI 9- 1/2 3 1/2 3 1/2 - 1/8 -3.5
ELECTRONIC M A S 3- 1/2 1 1/2 1 1/2 - 1/8 -7.7
ESSEX CORP INC 9- 1/2 3 1/2 3 1/2 - 1/8 -3.5
EVANS & SUTHERLAND 19- 1/2 11 1/2 11 1/2 - 1/2 -4.2
GANDALF TECHNOLOGIES 19- 1/2 11 1/2 11 1/2 - 1/2 -4.2
GEN'L DATA COMP CORP 19- 1/2 11 1/2 11 1/2 - 1/2 -4.2
GIANT INSTRUMENT CO 3- 1/2 1 1/2 1 1/2 - 1/8 -7.7
HOBAN LIES CORP 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
ICOT CORP 7- 1/2 3 1/2 3 1/2 - 1/8 -3.5
INFORMATION INTL INC 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4

INTEL CORP 73- 3/8 39 3/4 59 1/4 - 3/4 -1.2
LANDY ELECTRONICS 9- 1/2 3 1/2 3 1/2 - 1/8 -3.5
MEDIATA CORP 3- 1/2 1 1/2 1 1/2 - 1/8 -7.7
MEM COMP CORP 19- 1/2 11 1/2 11 1/2 - 1/2 -4.2
MEMREX CORP 19- 1/2 11 1/2 11 1/2 - 1/2 -4.2
NETWORK SYSTEMS CORP 19- 1/2 11 1/2 11 1/2 - 1/2 -4.2
NV AMERICAN PHILIPS 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
NORTHERN TELECOM LTD 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
OMNI 9- 1/2 3 1/2 3 1/2 - 1/8 -3.5
PERIPHONICS CORP 9- 1/2 3 1/2 3 1/2 - 1/8 -3.5
PRENTIS COMP 9- 1/2 3 1/2 3 1/2 - 1/8 -3.5
PRIMARY INFORMAT INC 7- 1/2 3 1/2 3 1/2 - 1/8 -3.5
PLESSEY CO (ADR) 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
SCIENTRONIX INC 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
SEMTECH CORP 9- 1/2 3 1/2 3 1/2 - 1/8 -3.5
SIEMENS CORP (ADR) 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
SOLEX CORP 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
SPERRY CORP 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
STORAGE ARRAYS/ARA 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
WANG-TEKO CORP 9- 1/2 3 1/2 3 1/2 - 1/8 -3.5

SCIENTIFIC ATLANTA 9- 1/2 3 1/2 3 1/2 0 0.0
SYSTRAN TECHNOLOGY 9- 1/2 3 1/2 3 1/2 0 0.0
SYSTRAN ENVIRONICS 9- 1/2 3 1/2 3 1/2 0 0.0
SYSTEMS & COMP TECH 9- 1/2 3 1/2 3 1/2 0 0.0
T SYS INC 9- 1/2 3 1/2 3 1/2 0 0.0
TAC PRODUCTS CO 3- 1/2 1 1/2 1 1/2 - 1/8 -7.7
TECHDATA CORP 3- 1/2 1 1/2 1 1/2 - 1/8 -7.7
TELEX 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
TELEXPRESS INC 19- 1/2 11 1/2 11 1/2 - 1/2 -4.2
TELEX 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
TERADYNE SYSTEMS 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
TIMEPLEX INC 19- 1/2 11 1/2 11 1/2 - 1/2 -4.2
VISUAL TECHNOLOGY 9- 1/2 3 1/2 3 1/2 0 0.0

SUPPLIES & ACCESSORIES

ADDITRON ASS PRDS 19- 1/2 11 1/2 11 1/2 - 1/2 -4.2
BARRY BRIGHT 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
DUPLEX PRODUCTS INC 19- 1/2 11 1/2 11 1/2 - 1/2 -4.2
MINTS IND. PRODS 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
3M COMPANY 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
TOWER CORP LTD 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
STANDARD REGISTER 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4
WALLACE COMP SERVICES 39- 1/2 20 1/2 20 1/2 - 1/2 -2.4

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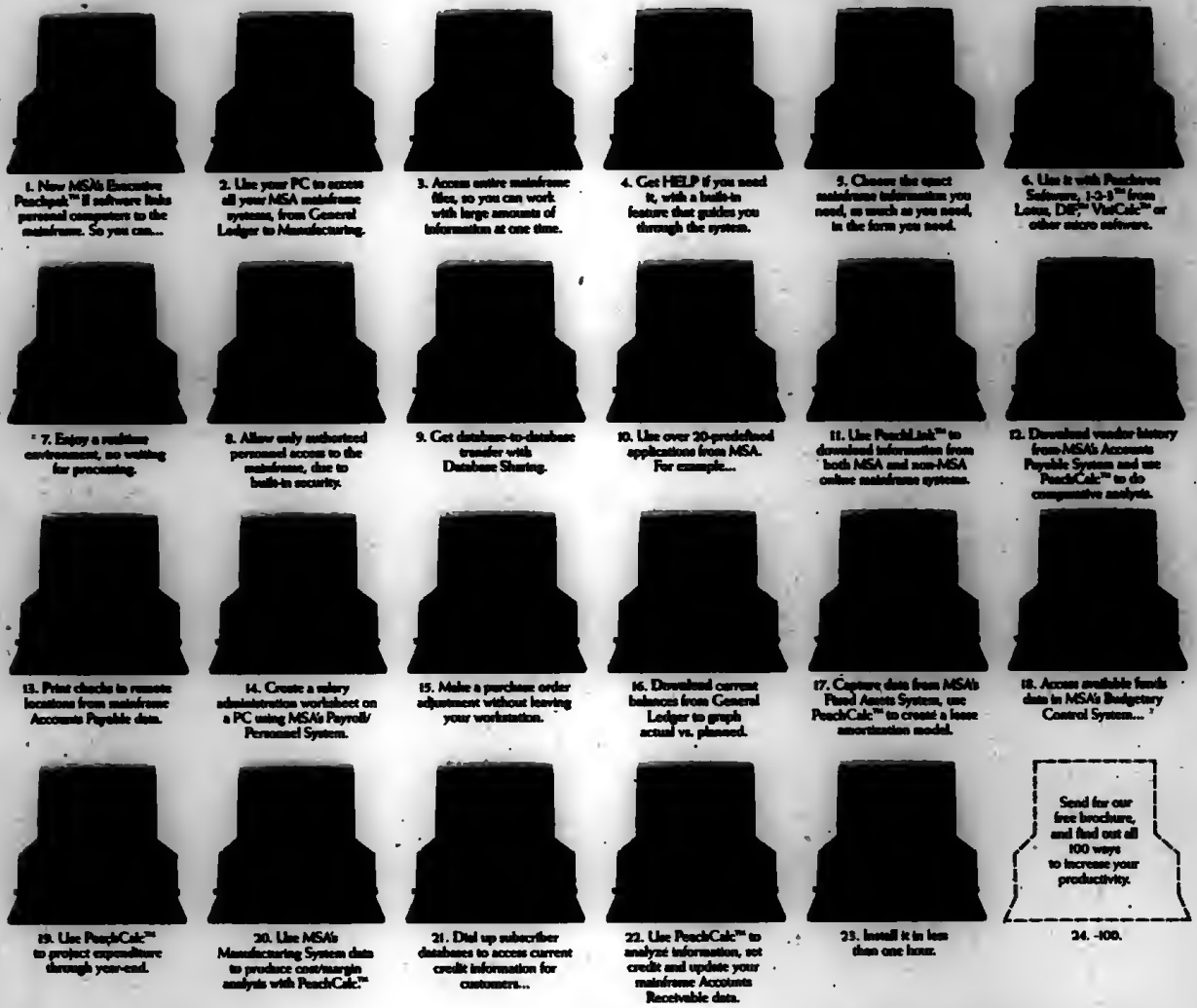
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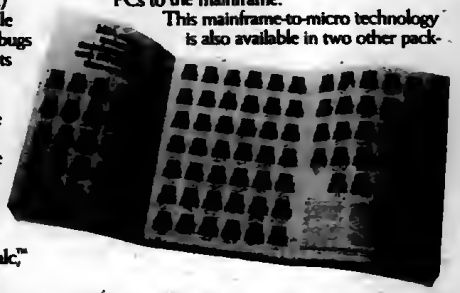

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